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COMMUNITY WATER SUPPLY STUDY, NEW ORLEANS, LOUISIANA. STANDARD METROPOLITAN STATISTICAL AREA

Bureau of Water Hygiene
Cincinnati, Ohio

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FINAL DRAFT

COMMUNITY WATER SUPPLY STUDY

NEW ORLEANS, LOUISIANA

Standard Metropolitan Statistical Area

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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FOREWORD

The study of the water supplies in the New Orleans SMSA was conducted by the Public Health Service, the Louisiana State Department of Health, and the 26 water supplies involved, as a part of a nationwide program to determine the situation with regard to the nation's drinking water supplies.

This particular report defines problems in each water system, points up the underlying causes for the existence of these problems and recommends solutions to the causes.

The purpose was to furnish a document to be used by each of the water supplies and the State Health Department to locate and correct physical and operational deficiencies found in the survey. Hopefully, this report will serve as a call to arms for all those concerned with annihilation of the underlying causes that permitted these conditions to develop.

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SUMMARY OF FINDINGS AND CONCLUSIONS

As a part of a nationwide study, in cooperation with the Division of Sanitary Engineering of the Louisiana State Department of Health and the 26 water supplies involved, a survey was made to assess the drinking water quality, water supply systems, and surveillance programs in the New Orleans Standard Metropolitan Statistical Area.

The following are the principal findings and conclusions of the study:

Two supplies serving 60% of the population met the constituent standards and had systems that were essentially free of major defects. Eighteen supplies serving 40% of the population failed to meet the recommended constituent standards and/or had major deficiencies in their systems. However, their capability to serve safe water was not seriously questioned. Five systems serving 4,220 persons had deficiencies that were serious enough to raise questions of continued safety. One system serving 200 persons exceeded the mandatory limit for fluoride.

Samples collected during the survey indicate that the water being delivered in 21 systems serving 99.8% of the population met the constituent limits listed in the PHS Drinking Water Standards, based on limited samples, but its continuous safe quality may be questionable because of lack of monitoring and health surveillance and supervision. Water quality in four systems serving 2,010 persons exceeded one or more of the PHS recommended standards, while one exceeded the mandatory standards for fluorides.

Deficiencies were found in each of the seven water supply components. However, the most significant problems were found in health surveillance, operation and control, operating personnel and adequacy of water quality

data. Distribution systems, treatment and source of supply deficiencies were not as critical as the first four. Problems were more pronounced in the groundwater supplies than in the surface water supplies.

The nine surface water supplies serve 97% of the population. These supplies receive the bulk of available health surveillance and supervision. Yet, only two of these supplies receive the minimum needed. Six surface supplies serving 95% of the population have certified operators, operation and control is inadequate on all nine, and water quality data is inadequate on seven.

The remaining 3% of the population are served by 17 groundwater supplies that receive little or no health surveillance and supervision. None have certified operators and 12 are operated by personnel who have never attended training schools. Operation and control is inadequate on all 17, and water quality data is inadequate on 16. Water of undesirable quality in terms of tastes, odors, iron, manganese and/or sand, is being delivered in seven surface supplies and 13 groundwater supplies.

Health surveillance and supervision is seriously lacking in the New Orleans SMSA. Engineering inspections are not frequent enough. Sampling for bacteriological, chemical and radiochemical quality is insufficient. The Health Department staff, although well-qualified, is not large enough to carry out its responsibilities.

Operation and control is very weak. This is evidenced by problems with tastes and odors, inadequacy of data, and by the absence of active programs for preventing, locating and removing health hazards such as cross-connections, backsiphonage, and low pressure areas.

Unqualified operating personnel is indicated by the small number (6) of certified responsible operators, and the large number (14) who have never attended a training school program. This situation further manifests itself in such components as operation and control and in treatment facilities.

Treatment facilities are adequate on the surface water supplies except for taste and odor control on two. However, treatment facilities are not provided on 14 groundwater supplies needing removal of one or more of the following: hydrogen sulfide, iron, manganese and sand.

Distribution systems of seven surface supplies were found to be substantially free of major defects, and two had major defects. Four groundwater distribution systems were essentially free of major defects, while 13 had major deficiencies.

The Mississippi River is the source for nine supplies serving 97% of the population. The remaining 18 supplies use groundwater from deep wells with outstanding natural protection by great depths, sand aquifers and high artesian pressures. The Mississippi River supplies are furnished protection by water pollution control programs and an alert network warning system for pollution spills.

RECOMMENDATIONS

The deficiencies found by this survey can only exist where health surveillance and supervision is inadequate, where responsible operators are not fully qualified and aware of the health significance of defects in systems and operations, and where consumers and/or local government officials are not aware of the situation or are unwilling to pay the price for good, safe water. Interaction between health personnel and operators reinforces and improves one another. Consequently, adequate health surveillance and supervision along with qualified, conscientious and informed operators and a public awareness will, in time, correct deficiencies such as those found during this survey, with the exception of treating the difficult Mississippi River water. Yet, too, significant improvements in treating this water can be expected as an additional benefit. Therefore, recommendations resulting from this study are that:

1. The State Department of Health Water Supply Program be furnished the manpower and other resources necessary to provide surveillance and supervision to meet the provisions of the Public Health Service Drinking Water Standards, particularly with respect to:

   a. Bacteriological sampling, including check samples each month in the numbers recommended for that system according to size.

   b. Chemical, physical and radiochemical analyses at the frequency necessary to furnish a sound monitoring program with minimum frequencies of once a year for surface supplies, and at three-year intervals for ground supplies.

   c. Minimum of one thorough engineering inspection or sanitary survey of each supply a year.

d. Establishment of programs in each supply for location and removal of health hazards.

2. Immediate steps be taken toward upgrading systems in the poor and fair classifications to comply with requirements of the Public Health Service Drinking Water Standards.

3. The State of Louisiana adopt legislation requiring a mandatory operator training and licensing program to insure that each public water system is under the responsible supervision of an operator certified as competent to operate that class system.

4. Steps be taken that will insure the absence of objectionable constituents such as taste, odor, hydrogen sulfide, iron, manganese, etc., from all water supplies.

5. Immediate steps be taken to provide the impetus for establishing active local programs for locating and removing health hazards in each of the water systems.

6. A community water supply program plan be developed to define the problems; delineate the program objectives, the methods to be used, the procedures to be used for evaluating accomplishments, and the resources needed to conduct the program.

INTRODUCTION

The purpose of the Community Water Supply Study (CWSS) was to determine if the American consumer's drinking water met the Drinking Water Standards.* To obtain nationwide coverage, the Bureau of Water Hygiene of the U. S. Public Health Service initiated the CWSS in February of 1969 in nine areas across the country. The field work for the CWSS was conducted by the Bureau of Water Hygiene, in cooperation with the state and local health departments and the water utilities.

This study was designed to give an assessment of drinking water quality, water supply systems, and surveillance programs in urban and suburban areas in each of the nine regions of the Department of Health, Education, and Welfare. These areas were selected to give examples of the several types of water supplies in the country. A whole Standard Metropolitan Statistical Area (SMSA) was the basis of each study, except in Region I where the entire State of Vermont was included, with evaluations made on all public water supply systems, as defined herein, in each study area. This coverage allowed an assessment of the drinking water quality of the large central city, the suburbs, and the smaller communities located in the counties in the SMSA, and the interaction between them.

Specifically, the objectives of this study were accomplished by determining whether or not:

1. The quality of the urban and suburban American consumer's drinking water in the selected study areas exceeded the Constituent Limits of the Drinking Water Standards (DWS);*
2. The water supply systems supplying this drinking water to the consumers were essentially free from major deficiencies;

*1962 U. S. Public Health Service Drinking Water Standards; PHS Publ. No. 956, Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, 61 pp.

3. The bacteriological surveillance programs over these water supply systems meet the established criteria (See page 15).

The authority for the Community Water Supply Study is found in Title III, Part A, Section 301, Public Health Service Act, amended (42 U. S. C. 241).

> "Sec. 301 - The Surgeon General shall conduct in the Service, and encourage, cooperate with, and render assistance to other appropriate public authorities, scientific institutions, and scientists in the conduct of, and promote the coordination of, research, investigations, experiments, demonstrations, and studies relating to the causes, diagnosis, treatment, control, and prevention of physical and mental diseases and impairments of man, including water purification..."

SCOPE

Public water supplies in the United States numbered 19,236 serving some 150,000,000 people when last inventoried in 1963.* The remaining 50,000,000 people had private water supplies. Most of the public water supplies were small, about 85 percent serving 5,000 or less people. About one-half of the public was served by the 18,837 supplies that each served 100,000 or less persons and the other one-half (77,000,000) were served by the 399 larger supplies. About 75 percent of these public water supplies have ground water as a source, while 18 percent use surface water. The remaining 7 percent have a mixture of ground and surface water source.

Systems Studied

This study covered 969 public water supply systems, including 885 community water supply systems (91.4% of the total) and 84 special water supply systems (9.6% of the total). For this study the following definitions of the systems were used.

PUBLIC WATER SUPPLY SYSTEM - A water supply system includes the works and auxiliaries for collection, treatment, storage, and distribution of water from the sources of supply to the free-flowing outlet of the ultimate consumer. Water supply systems were included in this study, if they had 15 or more service connections and/or served 25 or more consumers.

Special Water Supply Systems - are those systems serving trailer and mobile home parks, other tourist accomodations, and institutions with resident populations.

Community Water Supply Systems - are all other systems studied in an SMSA.

In this Region, 26 public water supply systems (2.7 percent of the national study total) were studied serving about 1,073,400 persons (percent of the national study total). They consisted of 17 ground water systems (wells and springs), 7 surface water systems, no systems with mixed (ground and surface) sources. and 2 systems buying finished water from another

*Statistical Summary of Municipal Water Facilities in the United States, January 1, 1963: PHS Publ. No. 1039, Government Printing Office, Washington, D. C. 1965, 66 pp.

system, hereafter called wholesale finished water source systems.

For the purpose of this report, water supply systems were divided into four categories; 1) those using surface water or a mixture of surface and ground water as a source; 2) those using ground water as a source (this category was further divided into; a) wells, b) springs, and c) springs and wells); and 3) those purchasing finished water as a source; and 4) special water supply systems. Table I gives data on type, population, average daily demand, and source for the supplies included in this study. Table II shows the number of systems in each category and the populations served.

Study Area

The details of the study area and the definition of Standard Metropolitan Statistical Area (SMSA) are given below.

> STANDARD METROPOLITAN STATISTICAL AREA -- The boundaries and titles of standard metropolitan statistical areas are established by the Bureau of the Budget with the advice of the Federal Committee on Standard Metropolitan Statistical Areas. An SMSA is a county or group of contiguous counties, which contains at least one city of 50,000 inhabitants or more or "twin cities" with a combined populations of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. (Region I can omit reference to SMSA).

Description of Study Area

The New Orleans, Louisiana Standard Metropoligan Statistical Area includes four parishes -- Orleans, Jefferson, St. Bernard and St. Tammany. Three of the parishes -- Orleans, St. Bernard and Jefferson -- make up the greater New Orleans metropolitan area. These lowland parishes lie along

the Mississippi River and are protected from flooding by levees and continuous drainage pumping. The terrain is flat and generally near or below sea level, necessitating extensive drainage pumping. The only undeveloped land is coastal marsh.

The fourth parish, St. Tammany, is separated from the major city complex by Lake Pontchartrain. Its terrain, only slightly rolling, is high enough in elevation that most of it is not subject to flooding. It is thickly wooded with southern pine and tends to be more rural than the other three parishes, often serving as an escape to the country for city dwellers.

The population of the New Orleans SMSA is 1.1 million persons, 97% of whom live in the heavy industrialized New Orleans area along the Mississippi River. The population projections * for this area are:

1960	1970	1980	1990
870,000	1,120,000	1,470,000	1,950,000

The Mississippi River bisects the study area, and is the gateway to all inland navigation in the mid-United States. The river is also relied on heavily by the people and industry of New Orleans, and makes the Port of New Orleans the most important on the Gulf Coast. The entire prosperity of this city is dependent on the Mississippi River.

The Mississippi River, in addition to supporting trade and industry, also acts as a carrier for much of this country's waste materials. It drains 1,249,800 square miles of mid-America and conveys municipal, industrial and agricultural wastes. Although the average runoff is large, approximately 3.5 trillion gallons a day, it has been used by over 53 million people, and innumerable industries with their wide range of waste characteristic

* Projections taken from Metropolitan Solid Waste Program Report, City of New Orleans, May 1968.

The 724 million acres of agricultural lands drained may be expected to contribute varying degrees of pesticides, insecticides, herbicides, fertilizers, etc. In addition to this extensive use and drainage, there is a steady movement of river traffic and upstream pipeline crossings, both of which present the hazard of spillage and leakage of various chemicals to the river.

Unique Aspects of Area

Natural Disasters

Warning system for spills along Mississippi River: The Mississippi River is the depository for vast quantities of our nation's wastes. It is also the receptacle for a suprising amount of toxic and noxious substances which are accidentally or illegally spilled into its waters. The Lower Mississippi River is particularly vulnerable to spills because of its vast chemical and petroleum industries and its extensive ship and barge traffic. Several spectacular river barge collisions have occurred along this stretch of river during the past few years.

To combat the threat of dangerous spills to the Mississippi River and its resultant effect on water systems using the river, the Louisiana State Department of Health developed a Waterworks Warning Network Plan on June 8, 1960, for the Lower Mississippi River. The system consists of a directory of State and water plant personnel and a detailed procedure for detection and notification of spills.

Through its years of existence, this plan has provided a useful service to the water purveyors and consumers in Louisiana.

Hurricane Camille

The New Orleans SMSA, like all the coastal areas bordering the Gulf of Mexico, is extremely susceptible to the affects of hurricanes

and tropical storms. This is best exemplified to New Orleans area residents by the most recent hurricane, "Camille", on August 18, 1969. Fortunately, Hurricane Camille's path carried it east of the metropolitan area and damage to the city was light. However, damage in Plaquemines Parish, south of New Orleans, was extreme. Two water systems were severely damaged and it has taken over three months to restore them to complete service.

Water supply systems are particularly vulnerable to the damaging affects of hurricanes. It can be completely incapacitated by the loss of a single critical component, such as electrical power. The ability of a water system to combat the unusual demands of a hurricane is attained through imaginative planning and design for auxiliary components such as power supply and stand-by disinfection equipment. These devices are needed to maintain pressure in the system and to provide extraordinary disinfection at all times. In addition to these devices, special treatment practices or an auxiliary water source may be necessary to combat toxic materials in the water system environment.

During this survey, it was found that most of the larger surface water systems were equipped with auxiliary power and stand-by disinfection devices. However, many of the smaller water systems, even those that are supplied by flowing wells and are unaffected by power loss, were found to need improvement in order to meet the challenges of a major disaster.

Taste and Odor

Fifteen supplies reported problems with tastes and odors. Seven of these use Mississippi River water, while eight use groundwater in St. Tammany Parish.

Hydrogen sulfide is a major cause for complaints in the groundwater supplies. There is no justification for the existence or the continuation of this problem. Aeration and chlorination singly or in combination are simple, inexpensive, and effective measures.

Removal of tastes and odors from the Mississippi River water, on the other hand, is quite complicated. A special survey of this problem was conducted as part of the Study. (Appendix D). The water plant records examined were inadequate to define the nature and extent of the problem. At most plants, routine threshold odor determinations were not made; several of the water plant operators discounted the value of such tests. Dates of the occurrence of the more severe taste and odor problems were generally not available.

Personnel at three of the six plants visited reported they had no particular concern over taste and odor problems.

A cursory examination of plant operation records revealed that most of the plants routinely applied low-level amounts of either activated carbon or potassium permanganate, with occasionally more substantial applications (about 10 mg/l activated carbon). The St. Bernard Parish Waterworks District No. 1 was an exception in that it routinely applied 4 mg/l $KMnO_4$ at the river intake.

Water plants using lower Mississippi River water appear to have a frequent or continuous low-level taste and odor problem. It appears that the more intense taste and odor of the water is associated with unusual industrial discharges, river traffic accidents, or river traffic loading and unloading operations. In most cases, such an occurrence may result in a taste and odor problem which is experienced at only one or two of the numerous plants drawing lower Mississippi River water.

Public Health Service assistance for solving this problem should be directed toward conducting research to evaluate available processes for reducing taste and odor of waters containing various types of petrochemicals.

The Federal Water Quality Administration has a five-year project costing $2,250,000 underway. The object is to identify those substances causing taste and odor in the lower Mississippi River water, to determine their source and to secure actions needed for their removal.

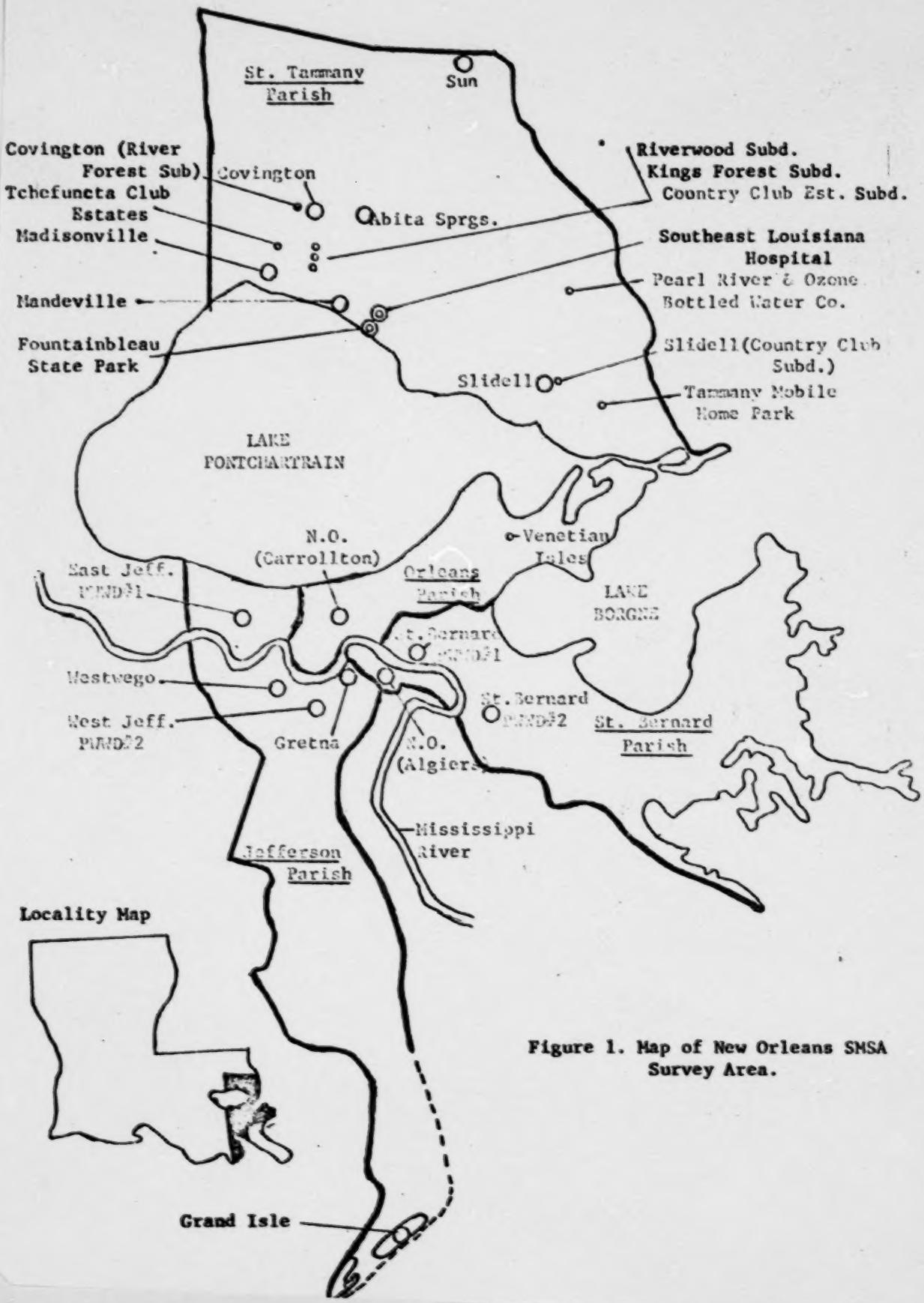

Figure 1. Map of New Orleans SMSA Survey Area.

TABLE 1
SUMMARY OF WATER SUPPLY SYSTEM TYPES

NAME OF SUPPLY	TYPE	POPULATION SERVED	AVERAGE * DAILY DEMAND (mgd)	WATER ** USAGE (gcpd)	SOURCE
Jefferson Parish					
E. Jefferson PWWD #1	Community	201,000	23.0	114.5	Miss. River
Grand Isle	Community	3,000	0.39	130.0	LaFourche [illegible] #1
Gretna	Community	27,000	3.34	123.7	Miss. River
W. Jefferson PWD #2	Community	100,000	9.13	91.3	Miss. River
Westwego	Community	15,000	2.5	166.7	Miss. River
Orleans Parish					
New Orleans (Algiers)	Community	40,000	6.27	156.7	Miss. River
New Orleans (Carrollton)	Community	600,000	123.3	206.0	Miss. River
Venetian Isles	Community	200	0.016	80.0	Well
St. Bernard Parish					
St. Bernard PWWD #1	Community	50,000	7.0	140.0	Miss. River
St. Bernard PWWD #2	Community	6,400	0.63	98.6	St.Bern. [illegible]
St. Tammany Parish					
Abita Springs	Community	1,200	Unknown	-	Wells
Covington	Community	9,000	1.0 Est.	-	Wells
Country Club Ests. (Slidell)	Community	400	Unknown	-	Well
Country Club Ests. Subd.	Community	600	Unknown	-	Wells
Fountainbleau State Park	Special	900	0.03 Est.	-	Well
Kings Forest Subd.	Community	160	Unknown	-	Well
Madisonville	Community	1,000	0.1 Est.	-	Wells
Mandeville	Community	3,000	0.296	98.7	Wells
Pearl River & Ozone WC	Community	120	0.05 Est.	-	Wells
River Forest (Covington)	Community	50	Unknown	-	Well
Riverwood Subd.	Community	300	Unknown	-	Well
Slidell	Community	12,000	2.5	208.0	Wells
S.E. Louisiana Hosp.	Special	775	0.3 Est.	-	Wells
Sun	Community	350	0.16	45.8	Well
Tammany Mobile Home Park	Special	250	Unknown	-	Well
Tchefuncta Club Ests.	Community	700	Unknown	-	Wells

TABLE 2 A

WATER TREATMENT PRACTICES IN THE SYSTEMS STUDIED

Region VII

Treatment Practice	Type of System (Number of Systems of each)						Overall System Totals	
	Surface Water & Mixed Source	Ground Water Source			Wholesale Finished Water Source	Special Systems	Number	Percent
		Springs	Wells	Mixture of Both				
Do not disinfect, clarify, or buy, chlorinated water	0	0	13	0	0	3	16	62
Disinfect only or buy chlorinated water	*0	0	1	0	2	0	*3	15
Clarification* and disinfection	7	0	0	0	0	0	*7	23
Clarification without disinfection	0	0	0	0	0	0	0	0
System Totals - Number	7	0	14	0	2	3	26	--

*Clarification is the removal of suspended material by coagulation, sedimentation and/or filtration.

TABLE 2 B

WATER TREATMENT PRACTICES IN THE SYSTEMS STUDIED

Region VII

Treatment Practice	Population Served in Thousands (Number of Systems of Each)							Overall System Totals	
	<.5	.5-5	5-10	10-25	25-50	50-100	>100	Number	Percent
Do not disinfect, clarify, or buy chlorinated water	8	6	1	1	0	0	0	16	62
Disinfection only or buy chlorinated water	1	1	1	0	0	0	*0	*3	15
Clarification* and disinfection	0	0	0	2	2	1	*2	*7	23
Clarification* without disinfection	0	0	0	0	0	0	0	0	0
System Totals - Number	9	7	2	3	2	1	2	26	--

*Clarification is the removal of suspended material by coagulation, sedimentation and/or filtration.

EVALUATION CRITERIA

Each water supply system was investigated on three bases: 1) drinking water quality was determined by sampling the finished and distributed water and returning these samples to the laboratories of the Bureau of Water Hygiene for bacteriological, chemical, and trace metal analyses, 2) the status of the water supply system facilities was determined by a field survey of the system and the gathering of data on three standard forms (four items were chosen to represent major problems; a) source(s), b) treatment, if any, c) distribution system pressures, and d) operation); 3) the status of the surveillance program over the water supply system was evaluated by obtaining bacteriological water quality data for the previous 12 months of record from state and county health department files.

Water Quality Criteria

Water quality was judged either:

(1) Not to exceed the Constituent Limits of the DWS (hereafter called Does not exceed limits) or,

(2) To exceed at least one "recommended" Constituent Limit (some are aesthetic parameters), but does not exceed any "mandatory" Constituent Limit (hereafter called Exceed recommended, but not mandatory limits) or,

(3) To exceed at least one "mandatory" Constituent Limit (hereafter called Exceed mandatory limits).

The limits for the constituents measured in this study are summarized in Table 5 below.

Partial List of Bacteriological, Chemical, and Physical Constituent Concentration Limits Taken from the 1962 U.S. Public Health Service Drinking Water Standards

RECOMMENDED LIMITS

(If the concentration of any of these constituents are exceeded, a more suitable supply or treatment should be sought)

Constituent	Limit
Alkyl Benzene Sulfonate (Measured as methylene-blue-active substances)	0.5 mg/l
Arsenic	0.01 mg/l*
Boron	1.0 mg/l**
Chloride	250 mg/l
Color	15 Units
Copper	1.0 mg/l
Carbon-Chloroform Extract (CCE)	0.200 mg/l
Cyanide	0.01 mg/l
Fluoride	
Temp. (Ann.Avg.Max.Day, 5 years or more)	
50.0-53.7	1.7 mg/l
53.8-58.3	1.5 mg/l
58.4-63.8	1.3 mg/l
63.9-70.6	1.2 mg/l
70.7-79.2	1.0 mg/l
79.3-90.5	0.8 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
Nitrate	45 mg/l
Radium-226	3 μμc/l (pc/l)***
Strontium-90	10 μμc/l (pc/l)***
Sulfate	250 mg/l
Total Dissolved Solids (TDS)	500 mg/l
Turbidity	
Untreated	5 Units
Treated by more than disinfection	1 Unit
Zinc	5 mg/l

MANDATORY LIMITS

(If the concentration of any of these constituents are exceeded, the further use of this water for drinking and culinary purposes should be evaluated by the appropriate health authority because water of this quality represents a potential hazard to the health of consumers.)

Constituent	Limit
Arsenic	0.05 mg/l
Barium	1.0 mg/l
Boron	5.0 mg/l**
Cadmium	0.01 mg/l
Chromium (hexavalent)	0.05 mg/l
Coliform organisms (Measured by membrane filter technique)	Fails std. if: a) Arithmetic average of samples collected greater than 1 per 100 b) Two or more samples (5% or more if more than 20 examined) contain densities more than 4/100 ml
Cyanide	0.2 mg/l
Fluoride	
Temp. (Ann.Avg.Max.Day - 5 years or more)	
50.0-53.7	2.4 mg/l
53.8-58.3	2.2 mg/l
58.4-63.8	2.0 mg/l
63.9-70.6	1.8 mg/l
70.7-79.2	1.6 mg/l
79.3-90.5	1.4 mg/l
Gross Beta activity (in the absence of α or Sr-90)	1,000 mμc/l (pc/l)***
Lead	0.05 mg/l
Selenium	0.01 mg/l
Silver	0.05 mg/l

*Although the recommended arsenic concentration is 0.01 mg/l, because of interferences in some waters, the concentration of arsenic was only determined to be less than 0.03 mg/l. For the purposes of this study, these waters were considered not to exceed the recommended standard.
**Proposed for inclusion in the Drinking Water Standards.
***If these limits are exceeded, refer to Section 6.2 of the DWS.

Facilities Criteria

Source, treatment, operation, and distribution facilities were judged either:

1) To be essentially free from major deficiencies, or
2) To have one or more of the following major deficiencies (where applicable)
   a) Inadequate source protection (in absence of disinfection or buying chlorinated water)
   b) Inadequate disinfection (if disinfection practiced
   c) Inadequate control of disinfection (if practiced or if purchasing chlorinated water)
   d) Inadequate clarification capabilities (if clarification practiced)
   e) Inadequate control of clarification (if clarification practiced)
   f) Inadequate pressure (<20 psi) in some or all areas of the distribution system

Bacteriological Surveillance Program Criteria

The bacteriological surveillance program over the water supply system was judged either:

1) To meet the following criteria or,
2) Not to meet one or both of the following,
   a) Collection of the required number* of bacteriological samples for no less than 11 months during the previous 12 months of record.
   b) Passing the bacteriological quality standard* for no less than 11 months during the previous 12 months of record.

*See pages 3-6 of the Drinking Water Standards.

METHODS

Field Survey

The regional office staff, in cooperation with the state and local health department officials prepared a listing of all known water supplies meeting the definition adopted for this study. The list contained the supply name, address, name of the superintendent or person in charge, indication of size and the telephone number. The list was cross-checked with community and subdivision names to eliminate duplication and establish those areas for which the water supply facilities were apparently unknown. A Form PHS-682, Report of Water Supply Used on Interstate Carriers, was prepared for each supply from state and local health department records. The completed list became the basis for work schedules for the field engineers.

Actual field surveys were made by one of the 20 PHS engineers from headquarters and the regional offices that made up the field staff. At the option of state and local health department staff members, they made surveys with the PHS engineers. (The staff of the field office made appointments by telephone, for the surveys, one to seven days in advance.) (The Kansas and Missouri state health departments made the appointments several weeks in advance of the study.) [Use appropriate sentence].

During the field survey, the engineer completed Forms ECA-18, Inventory of Municipal Water Facilities, and ECA-19 Municipal Water Supply Sanitary Survey, to provide information on source; treatment; operation; laboratory control; personnel; distribution; surveillance practices; planning for improvements; and water rates. Examples of the standard forms are in the Appendix.

Sampling Program

The following samples were collected and dispatched to various Bureau of Water Hygiene laboratories:

1) Raw water

One sample for bacteriological analysis.

2) Finished water ready for distribution

Four or 5 samples for chemical analyses as follows:

a) 2 1/2-gallon sample to the Northeast Water Hygiene Laboratory. This was a grab sample for most ground water and small surface water treatment plants, but where possible a 14-day composite was taken. The following analyses were made on this sample:

Arsenic	Cyanide	Sulfate
Boron	MBAS	TDS
Chloride	Nitrate	Turbidity
Color	Selenium	

b) 8-oz. aliquot sample for trace metals analysis was taken out of sample 2)a) above and sent to the Cincinnati Laboratory. The following analyses were made on this sample:

Barium	Copper	Manganese
Cadmium	Fluoride	Nickel
Chromium	Iron	Silver
Cobalt	Lead	Specific Conductance
		Zinc

c) 1-gallon sample for radioactivity analyses was sent to one of the three Bureau of Radiological Health laboratories. It was collected in the same manner as sample 2)a) above. The following analyses were made on this sample:

Specific gamma emitting radionuclides (I^{131}, Cs^{137}, Ba^{140})
Gross Alpha
Gross Beta
Radium-226, if gross alpha exceeded 3 pc/l
Strontium-90, if gross beta exceeded 10 pc/l
Tritium - (run on 10% of samples)

d) 1-gallon sample for pesticide analysis to the Gulf Coast Water Hygiene Laboratory from surface water supplies plus those ground water supplies where sampling was specifically requested by the state or county health officials. It was collected in the same manner as sample 2)a) above. The following analyses were made on this sample:

Aldin	Dieldrin	Heptachlor Epoxide
Chlordane	Endrin	Lindane
DDT	Heptachlor	Methoxychlor
		Toxaphene

e) 1 activated carbon monitor sample to the Cincinnati Laboratory from 110 selected water supplies, 94 of which were from surface sources. Carbon chloroform extract (CCE) and carbon alcohol extract (CAE) concentrations were determined from this monitor.

3) Distribution System
Samples for bacteriological and trace metal analyses at the rate of 10 percent of the number required by Figure 1, of the DWS, with a minimum of 2 each from any water supply.

Laboratory Procedures

Bacteriological

All samples were collected in 8-oz. sterile, plastic, wide-mouth, screw-capped bottles which contained 0.2 ml of a 10% solution of sodium thiosulfate as a dechlorinating agent. This concentration of thiosulfate was sufficient to neutralize a sample containing about 15 mg/l residual chlorine, an amount above any residual that was present. Refrigeration of all samples was required during transporation back to the laboratory. Maximum time between collection and analysis did not exceed 30 hours. The bacteriological procedures were those of Standard Methods.*

*Standard Methods for the Examination of Water and Wastewater, 12th Ed., APHA,AWWA, and WPCF. American Public Health Assoc. New York, N.Y., 1965, 796 pp.

The membrane filter (MF) procedure was used for total coliform detection in this study for three reasons. One, larger volumes (100-ml portions) of distributed water could be examined than with the MPN technique; two, the MF procedure yields more precise results; and three, less processing time would be involved per sample, so reexamination of many of the samples could have been made within the 30-hour time limit if required. All potable and source water samples were examined for total coliforms using M-Endo MF broth, incubated at 35°C for 20-24 hours. Because raw water quality varied with its source, three decimal sample portions were filtered, the volume being determined by the estimated water quality.

Any coliform colonies detected in the examination of a sample were further verified by transfer to phenol red lactose for 24- and 48-hour periods at 35°C incubation. All positive phenol red lactose broth tubes then were confirmed in brilliant green lactose at 35°C for verification of total coliforms and in EC medium at 44.5°C for detection of fecal coliforms. This procedure further confirmed the standard total coliform MF test and supplied additional information on the potentially hazardous occurrence of fecal coliform in those potable water supplies.

Basic knowledge was also needed on the general bacterial population of potable water. Therefore, the general population of bacterial count (plate count) was also made on all distribution system samples. Sample portions of 1 ml and 0.1 ml in plate count agar (Tryptone-Glucose-Yeast Agar), incubated 48 hours at 35°C were sufficient to yield the desired data.

Chemical

The five samples, as noted above, taken to determine the chemical quality of the finished and/or distributed water were analyzed as follows:

Sample 2)a), General Chemistry.

These constituents were generally determined by Standard Methods, except as listed below.

Barium

No standard method existed at the time this study was undertaken. An atomic absorption procedure, which will appear in the next edition of Standard Methods, was used and was found acceptable. The analysis was made only on those samples that had less than 2 mg/l because above that concentration the barium precipitates out of solution.

Chloride

A variation of the potentiometric titration procedure was used, which is a tentative method in Standard Methods, page 372. Rather than titrate with silver nitrate to a specified end-point in millivolts, using a glass electrode and a silver-silver chloride electrode, a standard curve was prepared that related millivolts to chloride concentration. The concentration of an unknown is then determined from the standard curve. The procedure was just as accurate as the titration method and was simpler to carry out.

Fluoride

A fluoride electrode method, which will appear in the next edition of Standard Methods, was used. Precision and accuracy was generally better than any other method and the method was simpler to carry out.

Sample 2)b), Trace Metals.

The atomic absorption spectrophotometer method was used for all heavy metals (cadmium, chromium, copper, iron, lead, manganese, silver, zinc, nickel, and cobalt) because its sensitivity, specificity, simplicity and speed of analysis far exceeded the usual wet chemical methods. An atomic absorption method for these metals will appear in the next edition of Standard Methods.

Sample 2)c), Radioactivity.

These radiological constituents were determined using standard radiological counting techniques.

Sample 2)d), Pesticides.

No standard procedure for pesticide determinations existed at the time the CWSS was undertaken. Gas chromatography is generally the accepted method of analysis and will appear in the next edition of Standard Methods. Therefore, this technique was used.

Sample 2)e), Organics (CCE and CAE).

These organic constituents were determined using standard extraction techniques.

RESULTS AND DISCUSSION

General Discussion and Observations

Twenty-six water supply systems were surveyed in the New Orleans SMSA; seventeen municipal, six private, one bottled water, and two state-owned. The two sources of water for the systems in this study are the Mississippi River and groundwater. All the water systems south of Lake Pontchartrain, except Venetian Isles (groundwater), and Grand Isle (LaFourche PWWD #1), depend on surface water from the Mississippi River. Eight of the nine surface water systems surveyed during this study take water from a 17.5 mile stretch of the Mississippi River. Surface water supplies serve 97% of the people covered in this study.

Sixteen of the 17 groundwater supplies are in St. Tammany Parish, north of Lake Pontchartrain and New Orleans. The economy of St. Tammany Parish is such that the communities are small. Slidell is the "metropolis" of the parish, with a population of 12,000. Residences, commercial establishments and industries are usually low-level structures somewhat reducing the dangers of contamination from backflow pressures. Health surveillance and supervision in Louisiana is the responsibility of the Bureau of Environmental Health, Division of Sanitary Engineering, Louisiana State Department of Health. However, the responsibility for collecting samples is usually delegated to the parish sanitarians. The program does not include work on viruses; nor does it include measuring radioactivity, except on the New Orleans plants, and pesticides.

The complex, unknown and unmeasured chemicals in the Mississippi River and their long-term affects on the population are of concern to the waterworks people, as well as to health officials. However, this situation is well beyond the scope of this survey and must await someone's future research efforts.

Assessing potential hazards and conveying the situation to others is a major obstacle to all preventive programs. This problem, as it relates to community water supply, is no exception. For one cannot even point to insatisfactory bacteriological results and say if one had drunk that water one would definitely have become sick, let alone say that a cross-connection represents a given number of sicknesses and deaths. Yet, we do know that these hazards are accidents looking for a time to happen.

In spite of these difficulties there is an excellent tool available for assessing the situation in terms that can be understood and that can be used with considerable uniformity throughout the country. This tool is the Public Health Service Drinking Water Standards. These standards represent the thinking of the most knowledgeable experts in water supply and public health in regard to what is necessary to insure safe, good water quality continuously. These standards have been endorsed by the American Water Works Association, the Conference of State Sanitary Engineers, and the State and Territorial Health Officers. Therefore, the Public Health Service Drinking Water Standards are the most practical tool for measuring the safety of water quality and water systems, as well as for measuring the adequacy of health surveillance and supervision as conducted by the individual states.

TABLE III

SOURCE OF SUPPLY

NAME OF SUPPLY	RAW WATER	BEST AVAILABLE	SUFFICIENT TO MEET DEMANDS	ADEQUATE PROTECTIC
Population over 100,000				
New Orleans (Carrollton)	Miss. River	Yes	Yes	Yes
E. Jefferson PWWD #1	"	Yes	Yes	Yes
W. Jefferson PWWD #2	"	Yes	Yes	Yes
Population 10,000-99,999				
New Orleans (Algiers)	Miss. River	Yes	Yes	Yes
Westwego	"	Yes	Yes	Yes
Gretna	"	Yes	Yes	Yes
St.Bernard PWWD #1	"	Yes	Yes	Yes
Slidell	3 wells	Yes	Yes	Yes
Population 1,000-9,999				
Grand Isle	La Fourche PWWD#1	Yes	Yes	Yes
St.Bernard PWWD #2	St.Bernard PWWD #1	Yes	Yes	Yes
Abita Springs	2 wells	Yes	Yes	Yes
Covington	3 wells	Yes	Yes	Yes
Madisonville	2 wells	Yes	Yes	Yes
Mandeville	2 wells	Yes	Yes	Yes
Population less than 1,000				
River Forest (Covington)	1 well	Yes	Yes	Yes
Country Club Estates (Slidell)	1 well	Yes	Yes	Yes
Sun	1 well	Yes	Yes	Yes
Private Supplies less than 1,000				
Venetian Isles	1 well	No	Yes	Yes
Country Club Estates Subd.	4 wells	Yes	Yes	Yes
Kings Forest Subdiv.	1 well	Yes	Yes	Yes
Riverwood Utility Corp.	1 well	Yes	Yes	Yes
Tchefuncta Club Estates	2 wells	Yes	Yes	Yes
Tammany Mobile Home Park	1 well	Yes	Yes	Yes
Bottled Water Companies less than 1,000				
Pearl River & Ozone Water Co.	2 wells	Yes	Yes	Yes
State Facilities less than 1,000				
Southeast Louisiana Hosp.	2 wells	Yes	No	Yes
Fountainbleu State Park	1 well	Yes	Yes	Yes

Source of Supply

Findings and Conclusions

Two principal sources of water are used in the New Orleans SMSA -- Mississippi River and deep wells. The Mississippi River furnishes water for eight supplies serving 1,051,000 persons or 97% of the SMSA's population. The remaining supplies are served by deep wells, except for one in St. Tammany Parish. The Mississippi River water is difficult to treat and results in considerable taste and odor problems. Varying degrees of quality protection are furnished the raw surface water through water pollution control programs and contingency plans for oil and hazardous materials. Additionally, the Louisiana Health Department has devised an alert warning system to report pollution spills. Mississippi River water, when measured by the usual water quality parameters, appears satisfactory.

The effective removal and the health affects of the many waste products in the Mississippi River are unknown and beyond the scope of this study. The pollution control programs, when fully implemented, will afford as high a degree of protection as can be expected from present technology, institutional arrangements, and the socioeconomics of the tremendous drainage area. The quantity is unmatched anywhere else in the United States. No other source of water with sufficient quantity is readily available, therefore, the present source must be accepted and made the most of through treatment.

Deep wells serve 17 supplies with water that is bacteriologically safe. Outstanding natural protection is furnished by great depths, sand aquifers, and high artesian pressures. However, 14 of the supplies have water containing one or more of the following: iron, manganese, hydrogen sulfide, sand.

The groundwater supply is satisfactory in quality (except for Venetian Isles with high fluorides) and quantity. However, treatment is needed to render the water more palatable for domestic use in 14 supplies.

Recommendations

This report recommends that:

The Mississippi River be accepted as the major source of water supply and that its shortcomings be overcome through improved treatment, supervision and surveillance.

TABLE IV

TREATMENT (Processes, Equipment, Facilities)

WATER SYSTEM	1/ CONVENTIONAL TREAT		SPEC 2/	DISINFECT	
	PROCESS	FACIL	TREAT	CAPAC	
Population over 100,000					
New Orleans (Carrollton)	Yes	Yes	Yes	Yes	Ye
E. Jefferson PWWD #1	Yes	Yes	Yes	Yes	Ye
W. Jefferson PWWD #2	Yes	Yes	No	Yes	Ye
Population 10,000-99,999					
New Orleans (Algiers)	Yes	Yes	No	Yes	Ye
Westwego	Yes	Yes	Yes	Yes	No
Gretna	Yes	Yes	Yes	Yes	Ye
St. Bernard PWWD #1	Yes	Yes	Yes	Yes	Ye
Slidell	N/A	N/A	No	N/A	-
Population 1,000-9,999					
Grand Isle	Yes	Yes	N/A	No	-
St. Bernard PWWD #2	(See St. Bernard PWWD #1)				
Abita Springs	N/A	N/A	N/A	N/A	-
Covington	N/A	N/A 1	Yes	N/A	-
Madisonville	N/A	N/A	No	N/A	-
Mandeville	N/A	N/A	No	N/A	-
Population less than 1,000					
River Forest (Covington)	N/A	N/A	No	N/A	-
Country Club (Slidell)	N/A	N/A	No	N/A	-
Sun	N/A	N/A	Yes	N/A	-
Private Supplies - pop. less than 1,000					
Venetian Isles	N/A	N/A	No	Yes	Ye
Country Club Estates Subd.	N/A	N/A	N/A	N/A	-
Kings Forest Subd.	N/A	N/A	No	N/A	-
Riverwood Subd.	N/A	N/A	No	N/A	-
Tchefuncta Club Estates	N/A	N/A	N/A	N/A	-
Tammany Mobile Home Park	N/A	N/A	N/A	N/A	-
Bottled Water Companies - pop. less than 1,000					
Pearl River & Ozone Water Co.	N/A	N/A	No	N/A	-
State Facilities - pop. less than 1,000					
Southeast Louisiana Hosp.	N/A	N/A	No	N/A	-
Fountainbleu State Park	N/A	N/A	No	N/A	-

1/ Disinfection, coagulation, sedimentation, filtration.

2/ T & O control, iron and Mn removal, H_2S, etc.

Treatment

Findings and Conclusions

Processes, facilities and equipment for conventional treatment (disinfection, coagulation, sedimentation and filtration) are provided in all surface water supplies. Special facilities and equipment for taste and odor control are provided in seven supplies. A number of the treatment plants are quite old, and two of these have common walls between finished water and unfinished water. A third plant has an old by-pass line still remaining.

Six of the surface supplies serving 94% of the population have satisfactory treatment facilities, while three serving 3% have minor deficiencies.

Treatment facilities on groundwater supplies are quite limited. Two have chlorination equipment and one also has iron removal facilities. The results of this survey show that additional treatment facilities are needed on 14 groundwater supplies for removal of one or more of the following: hydrogen sulfide, iron, manganese or sand. Seven groundwater supplies are satisfactory and ten have minor deficiencies.

Recommendations

This report recommends that:

1. The deficiencies found in this survey be corrected as soon as possible.
2. Adequate treatment facilities and equipment for removal of tastes and odors be provided to those surface supplies not now so equipped.
3. Equipment and facilities be added to the groundwater supplies as appropriate to remove hydrogen sulfide, iron, manganese, or other objectionable constituents amenable to treatment and/or removal.

TABLE V
DISTRIBUTION SYSTEM

NAME OF SUPPLY	METER-ED	ADEQUATE STORAGE (24-HOUR SUPPLY)	ADEQUATE PUMPING	ADEQUAT PRESSUR (>20 ps
Population over 100,000				
New Orleans (Carrollton)	Yes	No	Yes	Yes
E. Jefferson PWWD #1	Yes	No	Yes	Yes
W. Jefferson PWWD #2	Yes	No	Yes	Yes
Population 10,000-99,999				
New Orleans (Algiers)	Yes	Yes	Yes	Yes
Westwego	Yes	No	Yes	Yes
Gretna	Yes	No	Yes	Yes
St. Bernard PWWD #1	Yes	Yes	Yes	Yes
Slidell	No	No	Yes	Yes
Population 1,000-9,999				
Grand Isle	Yes	Yes	No	Yes
St. Bernard PWWD #2	Yes	No	No	No
Abita Springs	No	No	Yes	Yes
Covington	Yes	No	Yes	Yes
Madisonville	No	No	Yes	Yes
Mandeville	Yes	No	Yes	Yes
Population less than 1,000				
River Forest	Yes	Aquifer	Flowing	Yes
Country Club Estates (Slidell)	No	Aquifer	Flowing	Yes
Sun	Yes	Yes	Yes	Yes
Private Supplies less than 1,000				
Venetian Isles	Yes	Yes	Yes	Yes
Country Club Estates Subd.	No	Aquifer	Flowing	No
Kings Forest Subd.	No	Aquifer	Flowing	Yes
Riverwood Subd.	No	Aquifer	Flowing	Yes
Tchefuncta Club Estates	No	Aquifer	Flowing	Yes
Tammany Mobile Home Park	No	Aquifer	Flowing	Yes
Bottled Water Companies				
Pearl River & Ozone Water Co.	No	Aquifer	Flowing	No
State Facilities				
Southeast Louisiana Hospital	N/A	No	Yes	Yes
Fountainbleau State Park	N/A	Yes	Yes	Yes

Distribution Systems

Findings and Conclusions

Full appraisal of the distribution systems was beyond the scope and capabilities of this study. However, the study did find discernible problems in two surface water systems. Six do not have sufficient storage for a 24 hour supply and two have inadequate pumping capacity. Dangerously low pressures were found in one system. All surface supplies are metered.

Seven surface supplies serving 96% of the population were found satisfactory, and two serving 1% of the population had minor deficiencies.

Distribution systems for groundwater supplies were not designed as good as those for the surface supplies. Eight of the systems rely upon the aquifer to furnish both pressure and storage. Static pressures range from 20 to 32 psi. Therefore, one may expect that operating pressures will frequently drop below 20 psi. Six systems do not have adequate storage. Eleven groundwater supplies are not metered. (Use of meters reduces waste of water and is frequently desirable from this standpoint as this waste is a probable cause of low pressures). Two of the unmetered supplies are known to have low pressures. Significantly, these also rely on artesian pressure and storage. Three groundwater supplies are satisfactory, 12 have minor deficiencies and 2 have major deficiencies.

Recommendations

This report recommends that:

1. The deficiencies found in this survey be corrected as soon as possible.

2. The results of this study be followed up as indicated, with a full study by a consulting engineer, to determine if additional problems of storage, pumping and/or low pressures exist, and to remove them when found.

TABLE VI
OPERATION AND CONTROL

WATER SYSTEM	ADEQUATE OPERATIONAL CONTROL TESTS	OPERATING PROBLEMS	RESIDUAL CHLORINE IN DISTRIBUTION SYSTEM (PPM)	ADEQUATE RECORDS KEEPING	HEALTH HAZARD ELIMINA PROGRAM
Population over 100,000					
New Orleans (Carrollton)	Yes	(T&O)	0.65	Yes	No
E. Jefferson PWWD #1	No	(T&O)	1.07	Yes	No
W. Jefferson PWWD #2	No	(T&O)	0.10	Yes	No
Population 10,000-99,999					
New Orleans (Algiers)	No	(T&O)	0.62	Yes	No
Westwego	Yes	No	0.47	Yes	No
Gretna	No	T&O	0.03	Yes	No
St. Bernard PWWD #1	Yes	(T&O)	0.04	Yes	No
Slidell	NA	T&O	NA	No	No
Population 1,000-9,999					
Grand Isle	No	No	0.0	No	No
St. Bernard PWWD #2	Yes	T&O	0.0	Yes	No
Abita Springs	NA	No	NA	No	No
Covington	NA	T&O Mn	NA	No	No
Madisonville	NA	Mn	NA	No	No
Mandeville	NA	(T&O) Mn	NA	Yes	No
Population less than 1,000					
River Forest (Covington)	NA	T&O Mn	NA	No	No
Country Club (Slidell)	NA	T&O,Mn,Fe	NA	No	No
Sun	No	Fe, S	NA	No	No
Private Supplies less than 1,000					
Venetian Isles	No	(Color)	3.00	Yes	No
Country Club Estates Subd.	NA	No	NA	No	No
Kings Forest Subd.	NA	T&O,S,Fe	NA	No	No
Riverwood Subd.	NA	(T&O,Fe,S)	NA	No	No
Tchefuncta Club Estates	NA	No	NA	No	No
Tammany Mobile Home Park	NA	No	NA	No	No
Bottled Water Companies less than 1,000					
Pearl River & Ozone Water Co.	NA	T&O	NA	No	No
State Facilities less than 1,000					
Southeast Louisiana Hospital	NA	T&O, Mn	NA	Yes	Yes
Fountainbleau State Park	NA	T&O	NA	No	No

T&O - Taste & Odor
Fe - Iron
Mn - Manganese
S - Sand
(O) - Also most frequent customer complaint.

Operation and Control

Findings and Conclusions

Operation and control are considered along with health surveillance as key protection components in water systems.

Six of the surface systems do not practice adequate control testing. Taste and odor problems were reported in seven of the nine surface water systems indicating ineffective taste and odor removal. Inadequate chlorine residuals were found in five systems. One did not keep adequate records. Only two of the surface systems operated active programs for preventing, locating, and removing health hazards such as cross-connections, back siphonage, and low pressure areas. These were the two New Orleans systems where programs are being initiated and at this time are minimal. Operation and control was acceptable on all nine surface supplies.

Only two of the 17 groundwater supplies have treatment. Control testing on these is inadequate and treatment facilities on one are not operated. Thirteen reported problems with one or more of the following: hydrogen sulfide, iron, manganese, and sand. Fifteen of the systems keep records. Sixteen do not have active programs for preventing, locating and removing health hazards such as cross-connections, back siphonage, and low pressures. Operation and control was satisfactory on one groundwater system and acceptable on 16.

Recommendations

This report recommends that:

1. Immediate steps be taken to institute adequate process control testing.

2. Each supply immediately initiate steps to develop and implement active programs for preventing, locating, and eliminating health hazards in the treatment plants and distribution systems.

3. Chlorine residuals be maintained throughout those systems practicing chlorination.

TABLE VII

PERSONNEL (Responsible Operator)

WATER SYSTEM	STATE CERTIFICATION	ATTENDANCE AT STATE SHORT SCHOOL	1/ FULL-TIME EMPLOYEE
Population over 100,000			
New Orleans (Carrollton)	Yes	Yes	Yes
E. Jefferson PWWD #1	Yes	Yes	Yes
W. Jefferson PWWD #2	Yes	Yes	Yes
Population 10,000-99,999			
New Orleans (Algiers)	Yes	Yes	Yes
Westwego	No	No	Yes
Gretna	Yes	Yes	Yes
St. Bernard PWWD #1	Yes	Yes	Yes
Slidell	No	No	Yes
Population 1,000-9,999			
Grand Isle	No	Yes	Yes
St. Bernard PWWD #2	No	No	Yes
Abita Springs	No	No	Yes
Covington	No	No	Yes
Madisonville	No	No	Yes
Mandeville	No	Yes	Yes
Population less than 1,000			
River Forest (Covington)	No	No	No
Country Club (Slidell)	No	No	Yes
Sun	No	No	No
Private Supplies less than 1,000			
Venetian Isles	No	No	No
Country Club Estates Subd.	No	Yes	No
Kings Forest Subd.	No	Yes	No
Riverwood Subd.	No	Yes	No
Tchefuncta Club Estates	No	No	No
Tammany Mobile Home Park	No	No	No
Bottled Water Companies less than 1,000			
Pearl River & Qzone Water Co.	No	Yes	Yes
State Facilities-population less than 1,000			
Southeast Louisiana Hosp.	No	No	Yes
Fountainbleau State Park	No	No	Yes

1/ This was not used in determination of rating.

Personnel

Findings and Conclusions

This survey could not accurately measure the qualifications of principal operators since they are not required to be certified and/or attend training schools. However, a voluntary training and certification program is in existence and furnishes excellent training to those relatively few operators who choose to participate. Participation in the training courses and certification are used as a measure of qualification of principal operators for purposes of this report. Six of the nine principal operators on surface water systems serving 95% of the population are certified and seven have attended short training schools. All nine are full-time employees.

Qualification of principal personnel was satisfactory on six surface supplies and acceptable on the remaining three.

None of the 17 principal operators of groundwater supplies were certified and 12 have never attended short training schools. Eight are part-time employees.

Principal operators on all 17 groundwater systems were acceptable.

Recommendations

This report recommends that:

1. Proper certification be required for operators in each level of responsibility.

2. Training programs be upgraded to the point that every operator can and will be required to attend classes as appropriate to gain and maintain the proficiency necessary to properly conduct his job assignment.

TABLE VIII
HEALTH SURVEILLANCE

WATER SYSTEM	# YEARS SINCE LAST: RECORD OF SAN SURVEY	# YEARS SINCE LAST: RECORD OF CHEM ANAL.	BACTERIOLOGICAL SAMPLING # OF MONTHS: INADEQUATE SAMPLING	BACTERIOLOGICAL SAMPLING # OF MONTHS: NO SAMPLE COLLECTED
Population over 100,000				
New Orleans (Carrollton)	1	*	0	0
E. Jefferson PWWD #1	2	*	12	0
W. Jefferson PWWD #2	2	*	12	0
Population 10,000-99,999				
New Orleans (Algiers)	1	*	9	0
Westwego	1	2	12	0
Gretna	2	2	12	1
St. Bernard PWWD #1	1	1	12	0
Slidell	1	5	12	10
Population 1,000-9,999				
Grand Isle	6	1	12	12
St. Bernard PWWD #2	8	5	5	3
Abita Springs	2	9	9	7
Covington	6	6	12	7
Madisonville	1	2	12	7
Mandeville	7	7	12	6
Population less than 1,000				
River Forest (Covington)	6	4	No record	No record
Country Club (Slidell)	1	None	No record	No record
Sun	No record	0	9	9
Private Supplies - pop.less than 1,000				
Venetian Isles	4	4	1	1
Country Club Estates Subd.	None	14	12	7
Kings Forest Subd.	None	4	12	9
Riverwood Subd.	None	8	12	8
Tchefuncta Club Estates	5	3	12	8
Tammany Mobile Home Park	None	None	No record	No record
Bottled Water Companies - pop. less than 1,000				
Pearl River & Ozone Water Co.	None	5	12	8
State Facilities - pop.less than 1,000				
Southeast Louisiana Hosp.	2	10	12	9
Fountainbleu State Park	1	19	12	9

* Run daily by purveyor - not by State Health Department.

Health Surveillance and Supervision

Findings and Conclusions

Surveillance and supervision by the State Health Department is seriously lacking. Engineering inspections are not made frequently enough. Sampling for bacteriological, chemical and radiochemical quality does not provide continuity of data necessary to determine water quality on a continuous basis.

Engineering inspections on the surface supplies, while seriously lacking, were more frequent than on the ground supplies. Three of the nine surface supplies were inspected during the preceding 12 months, four between one and two years preceding the survey, and two from six to eight years. The latter two are distribution systems for which the wholesaler is responsible for maintenance. Chemical analyses on five of these supplies are not frequent enough. Bacteriological sampling on six was below the required number for each of the preceding 12 months with one supply not collecting any samples at all. There is no program for determining radiochemicals (except New Orleans) and pesticides.

The health surveillance rating was satisfactory for two of the surface supplies serving 60% of the SMSA's population, acceptable on six serving 37%, and unacceptable on one (distribution system only).

Latest engineering inspections were made on four of the groundwater supplies during the past year, on two between one and two years, on five over four years, and there was no record of six having ever been inspected. There were no records of chemical analyses on two supplies and 13 had not been analyzed in over four years.

Bacteriological sampling on 13 groundwater supplies had not been adequate for any of the preceding 12 months, 16 were not sampled at all

for six or more of the preceding 12 months. There is no program for determining radiochemicals and pesticides.

Health surveillance was acceptable on one groundwater supply and unacceptable on 16. The fact that the 16 supplies receiving poor health surveillance are all located in the same parish was noted.

The water supplies in the New Orleans SMSA are not receiving satisfactory health surveillance and supervision. The reason for this inadequacy is due primarily to shortage of resources for conducting a program.

Personnel quality is excellent. The Health Department engineers are well-qualified as measured by training, experience, and performance records. However, there just simply are not enough personnel positions to accomplish the workload required to furnish satisfactory health surveillance and supervision to water supplies. The field engineers are assigned general public health duties and consequently can devote only a small portion of their time to water supplies. Disasters place a great deal of demand on engineering services. Added to this are the existing vacancies for which there are no qualified applicants. Even with these vacancies filled, the staff would still be significantly inadequate.

Since qualified applicants are not available to fill the existing vacancies, one may conclude that salaries and benefits are not competitive with other engineering jobs.

Recommendations

This report recommends that:

1. Necessary resources be provided to conduct a program of health surveillance and supervision commensurate with the requirements of the Public Health Service Drinking Water Standards.
2. Salaries and benefits be made competitive with those of competitors for health surveillance and supervisory talent.

3. Health surveillance and supervision activities be furnished the manpower and other resources required to meet the provisions of the Public Health Service Drinking Water Standards, particularly with respect to:

   a. Bacteriological sampling each month in the numbers recommended for that system according to size.

   b. Chemical, physical and radiochemical analyses at the frequency necessary to furnish a sound monitoring program with minimum frequencies of once per year for surface supplies and at three-year intervals for ground supplies.

   c. Minimum of one thorough engineering inspection or sanitary survey of each supply a year, including necessary public health supervision.

   d. Establishing programs in each supply for location and removal of health hazards from the system.

WATER QUALITY

WATER SUPPLY	EVALUATION FROM STATE AND WATER SUPPLY RECORDS						CWSS SURVEY DATA *		
	BACTERIOLOGICAL		CHEMICAL		PHYSICAL		QUALITY DEFICIENCIES		
	ADEQUACY	QUALITY	ADEQUACY	QUALITY	ADEQUACY	QUALITY	BACTERIOLOGICAL	CHEMICAL	PHYSICAL
Community Water Supplies									
Abita Springs	Poor	Good	Poor	Good	Poor	Good	-	Mn	-
Covington	Poor	Good	Poor	Fair	Poor	Good	-	-	-
Country Club Ests.	Poor	Unknown	Poor	Unknown	Poor	Unknown	-	-	-
Country Club Ests Subd.	Poor	Good	Poor	Good	Poor	Good	-	-	-
E. Jefferson PWWD #1	Fair	Good	Fair	Good	Fair	Good	-	-	-
Grand Isle	Poor	Unknown	Fair	Good	Fair	Good	-	-	-
Gretna	Fair	Good	Good	Good	Fair	Good	-	-	-
Kings Forest Subd.	Poor	Good	Poor	Fair	Poor	Good	-	Mn	-
Madisonville	Poor	Good	Good	Good	Fair	Good	-	-	-
Mandeville	Poor	Good	Poor	Good	Poor	Good	-	-	-
New Orleans (Algiers)	Good	Good	Good	Good	Good	Good	-	-	-
New Orleans (Carroll)	Good	Good	Good	Good	Good	Good	-	-	-
Pearl Riv. & Ozone WC	Poor	Good	Poor	Unknown	Poor	Unknown	-	-	-
River Forest (Cov.Mun)	Poor	Unknown	Poor	Good	Poor	Good	-	Mn	-
Riverwood Subd.	Poor	Good	Poor	Good	Poor	Good	-	-	-
St. Bernard PWWD #1	Fair	Good	Good	Good	Fair	Good	-	-	-
St. Bernard PWWD #2	Fair	Good	Poor	Good	Poor	Good	-	-	-
Slidell	Poor	Good	Poor	Good	Poor	Good	-	-	-
Sun	Poor	Good	Fair	Poor	Fair	Poor	-	MN	Turb.
Tchefuncta Club Ests.	Poor	Good	Fair	Good	Fair	Good	-	-	-
Venetian Isles	Good	Good	Fair	Poor	Fair	Good	-	F,TDS	-
W. Jefferson PWWD #2	Fair	Good	Good	Good	Fair	Good	-	-	-
Westwego	Fair	Good	Good	Good	Fair	Good	-	-	-
Special Water Supplies									
Fountainbleau State Pk.	Poor	Good	Poor	Good	Poor	Good	-	-	-
S.E. Louisiana Hosp.	Poor	Good	Poor	Good	Poor	Good	-	-	-
Tammany Mobile Home Pk.	Poor	Unknown	Fair	Good	Fair	Good	-	-	-

* Radiochemical and pesticide analyses were also included in the survey. All results conformed to PHS Drinking Water Standards.

Water Quality

Findings and Conclusions

The evaluation of water quality delivered to the consumer involved both water quality data and its quantity. Consequently, the evaluations of existing data reflects in part the inadequacies of health surveillance. Data is also considered a responsibility of the water supply. The existing, but in many cases, meager data indicates that safe water is being delivered to all but 200 customers. However, records and reports indicate that water of unsuitable quality in terms of taste and odor, iron, manganese, and/or sand are at times being delivered in seven surface supplies and 13 groundwater supplies. (See Table VI).

Adequacy of bacteriological data was good on two surface supplies, fair on six, and poor on one with available data, good on eight and unknown on one. Chemical and physical data were considered adequate in quantity on six, fair on two and poor on one, with the available data good on all. Radiochemical and pesticide data are inadequate, but data collected during the survey met the quality standards.

Water quality risk was rated good on two of the surface supplies serving 59% of the population, fair on six serving 38% of the population, and poor on one serving 3,000 persons.

Quantity of bacteriological data was good on one groundwater supply, and poor on 16 with available data indicating a rating of good on 13 and unknown on four. Quantity of chemical data was good on one, fair on four and poor on 13, with available data, indicating 11 good, two fair, one poor and two unknown. Quantity of physical data was fair on five, poor on 12 with available data rating good on 14, poor on one, and unknown on two.

Radiochemical and pesticide data was not available, except for radiochemical data on the New Orleans plant which was good.

The overall water quality risk was fair for 11 groundwater supplies, and poor for six.

Sample data collected during the survey showed the quality on all nine surface supplies and on 11 of the groundwater supplies met the constituent limits of the PHS Drinking Water Standards. Four groundwater supplies exceeded the Standards for manganese and one of these also exceeded the turbidity standard. One small supply serving 200 persons exceeded the mandatory limit of the fluoride standard. It also exceeded the total dissolved solids standard.

Recommendations

This report recommends that:

Sufficient water quality data be collected to determine continuously the quality of water being delivered to consumers.

APPENDIX A

SUMMARY TABLE OF WATER SYSTEMS EVALUATIONS

SUMMARY TABLE OF WATER SYSTEM EVALUATIONS

NAME OF SUPPLY	POP. SERVED	TYPE OF SUPPLY	MAJOR DEFICIENCY (IES)	REMARKS
New Orleans (Algiers)	40,000	Community	None	Inadequate cross-connection contro program - common wall in treatment plant
New Orleans (Carrollton)	600,000	Community	None	Inadequate cross-connection contro program - cross-connection found in plant.
Abita Springs	1,200	Community	Unacceptable frequency of bacteriological sampling.	Exceeds manganese recommended limit (0.101 mg/l). Inadequate cross-connection control program. New mains & repair work not provided w/disinfection prior to return to service.
Covington	9,000	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate	Inadequate cross-connection control program.
Country Club (Slidell Municipal)	400	Community	Health surveillance nonexistent.	Inadequate cross-connection control program.
Country Club Estates Subdivision	600	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate. Quantity and pressures reported low.	Inadequate cross-connection control program.
E. Jefferson PWWD #1	201,000	Community	Unacceptable frequency of bacteriological sampling.	Inadequate cross-connection control program.
Gretna	27,000	Community	Unacceptable frequency of bacteriological sampling.	Inadequate cross-connection control program.
Fountainbleau State Park	900	Special	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate.	Inadequate cross-connection control program.
Kings Forest Subdivision	160	Community	Unacceptable frequency of bacteriological sampling.	Exceeds manganese recommended limit (0.082 mg/l). Inadequate cross-connection control program.
Madisonville	1,000	Community	Unacceptable frequency of bacteriological sampling. Inadequate health surveillance.	Inadequate cross-connection control program.
Mandeville	3,000	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate (sampling & inspec)	Inadequate cross-connection control program.

SUMMARY TABLE

NAME OF SUPPLY	POP. SERVED	TYPE OF SUPPLY	MAJOR DEFICIENCY (IES)	REMARKS
Riverwood Subdivision	300	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate.	Exceeds manganese recommended limit (0.059 mg/l). Inadequate cross-connection control program.
St. Bernard PWWD #1	50,000	Community	Unacceptable frequency of bacteriological sampling.	Treatment (mixing & flocculation) is problem. Raw water intake in poor location. Inadequate cross-connection control program.
St. Bernard PWWD #2	6,400	Community	Unacceptable frequency of bacteriological sampling. System has areas of low pressure (4 psi). Health surveillance inspection outdated.	Pump capacity inadequate. Inadequate cross-connection control program.
Slidell	12,000	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate. Quantity and pressure reported low.	Inadequate cross-connection control program.
Southeast Louisiana Hospital	775	Special	Unacceptable frequency of bacteriological sampling. Health surveillance inspection outdated.	None
Tammany Mobile Home Park	250	Special	Health surveillance nonexistent.	Inadequate cross-connection control program.
West Jefferson PWWD #2	100,000	Community	Unacceptable frequency of bacteriological sampling.	Inadequate cross-connection control program.
Westwego	15,000	Community	Unacceptable frequency of bacteriological sampling.	Inadequate cross-connection control program. Common wall between filter and clear well.
Grand Isle	3,000	Community	Unacceptable frequency of bacteriological sampling. Pumping and pressures are reported low. Health surveillance inspection outdated.	Inadequate cross-connection control program.
Pearl River & Ozone Water Co.	120	Community	Unacceptable frequency of bacteriological sampling. Low pressures in system (7 psi). Health surveillance inadequate.	Inadequate cross-connection control program.
River Forest (Covington Municipal)	50	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate.	Inadequate cross-connection control program.

NAME OF SUPPLY	SERVED	SUPPLY	MAJOR DEFICIENCY (S)	
Sun	350	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate. Plans and specifications for system not "Approved"	Exceeds manganese (0.053 mg/1) & turbidity (6.0 mg/1) recommended limits. Inadequate cross-connection control program.
Tchefuncta Club Estates	700	Community	Unacceptable frequency of bacteriological sampling. Health surveillance inadequate.	Inadequate cross-connection control program.
Venetian Isles	200	Community	Exceeds fluoride mandatory limit (1.9 mg/1). Operation & control is inadequate. Health surveillance inspection outdated.	Exceeds TDS recommended limit (711.9 mg/1). Inadequate cross-connection control program.

APPENDIX B

WATER QUALITY DATA FROM SURVEY

TABLE I - CHEMICAL RESULTS

0004 721003W00520 ABITA SPRINGS WATER DEPT. ABITA SPRINGS, LOUISIANA 70420

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RG	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721003W00520	1200	1	1	000	000	00	00	000	00	00	000	000	0	0	0	000	0	2 WELLS	

AVERAGE

ABS 0002	BA 0000	CD 0004	CR 0004	CCE 0000	F 0002	PB 0004	NO3 0002	SE 0002	SO4 0002	ZN 0004	TURB 0002	BETA 0002	AVERAGE NO.
.05	.000	.000			0.14 □	.008	0.0	.001	8.8	.083	0.10	0.	

NC.	AS 0002	B 0002	CL 0002	CU 0004	CN 0002	FE 0002	MN 0002	AG 0004	TDS 0002	COLOR 0002	ALPHA 0002	COLI 0002	
	.00	.00	0.0	.012	.000	.014	.059 *	.000	188.	0.	0.	0.0	01

MAXIMUM

ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
.07	.000	.000			0.15 □	.012	L .1	.002	10.	.274	0.12	1.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	.00	L 1.0	.016	.000	.017	.093 *	.000	191.	L 5.	0.	0.0

0004 721201500520 COVINGTON WATER DEPT. COVINGTON, LOUISIANA 70433

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RG	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721201500520	9000	1	1	200	000	00	00	000	00	00	000	000	0	0	0	000	0	3 WELLS	001.00

AVERAGE

ABS 0002	BA 0000	CD 0004	CR 0004	CCE 0000	F 0004	PB 0004	NO3 0002	SE 0002	SO4 0002	ZN 0004	TURB 0002	BETA 0002	AVERAGE NO.
.05	.000	.000			0.21 □	.004	0.2	.001	8.4	.011	0.12	0.	

NC.	AS 0002	B 0002	CL 0002	CU 0004	CN 0002	FE 0004	MN 0004	AG 0004	TDS 0002	COLOR 0002	ALPHA 0002	COLI 0004	
	.00	.00	0.0	.017	.000	.010	.023	.000	174.	0.	0.	0.0	00

MAXIMUM

ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
.06	.000	.000			0.27 □	.011	0.5	.002	9.	.015	0.14	1.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	L .100	L 1.0	.035	.000	.014	.050 *	.000	186.	L 5.	0.	0.0

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, □ LESS THAN OPTIMUM CONCENTRATION OF F.

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UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB, AND COLOR IN PTC. UNITS

0007 721201550520 COUNTRY CLUB ESTATES TIDEWATER UTIL..230 ROBINHOOD DR., COVINGTON, LOUISIANA 70433

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721201550520	595	1	2	202	000	00	00	000	00	00	000	000	0	0	0	000	0	4 WELLS	

AVERAGE ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
0002	0000	0006	0006	0000	0006	0006	0002	0002	0002	0006	0002	0002	NO.
.07		.000	.000		0.11 ▫	.004	0.0	.002	9.3	.010	0.11	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0002	0002	0002	0006	0002	0006	0006	0006	0002	0002	0002	0006	00
	.00	.00	0.0	.027	.001	.006	.021	.000	165.	0.	0.	0.0	

MAXIMUM ABS	BA	CD	CR	CCE	F	MAXIMUM PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
.07		.000	.000		0.12 ▫	.008	0.0	.002	10.	.013	0.12	1.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	L .100	L 1.0	.061	.003	.014	.050	.000	166.	L 5.	0.	0.0

* * * \

UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB, AND COLOR IN [illegible] UNITS

0003 721201600920 RIVER FOREST SUBDIVISION COVINGTON, LOUISIANA 70433

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721201600520	048	1	1	000	000	00	00	000	00	00	000	000	0	0	0	000	0	1 WELL	

AVERAGE ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE NO.
0001	0000	0003	0003	0000	0003	0003	0001	0001	0001	0003	0001	0001	
					□								
.04		.000	.011		0.36	.004	0.0	.002	13.	.012	0.15	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0003
	.00	.25	5.5	.014	.000	.005	.003	.000	251.	0.	0.	0.0

00

MAXIMUM ABS	BA	CD	CR	CCE	F	MAXIMUM PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
					□								
.04		.000	.033		0.36	.008	L .1	.002	13.	.021	0.15	0.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	.25	5.5	.023	.000	.009	.004	.000	251.	L 5.	0.	0.0

* *

0003 721201610520 RIVERWOOD UTILITY CORP. 230 ROBINHOOD DRIVE COVINGTON, LOUISIANA 70433

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721201610520	300	1	2	000	000	00	00	000	00	00	000	000	0	0	0	000	0	1 WELL	

AVERAGE ABS	BA	CD	CR	CCE	F	PB	AVERAGE NO3	SE	SO4	ZN	TURB	BETA	AVERAGE NO.
0001	0000	0003	0003	0000	0003	0003	0001	0001	0001	0003	0001	0001	
					□								
.06		.000	.000		0.14	.010	0.1	.002	8.6	.009	0.11	1.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0003
	.00	.00	0.0	.011	.000	.010	.058 *	.000	182.	0.	0.	0.0

01

MAXIMUM ABS	BA	CD	CR	CCE	F	MAXIMUM PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
					□								
.06		.000	.000		0.15	.012	0.1	.002	8.6	.018	0.11	1.	

EXCD	AS	B	CL	CU	CN	FE	MN 3	AG	TDS	COLOR	ALPHA	COLI
	L .030	L .100	L 1.0	.017	.000	.014	.061 *	.000	182.	L 5.	0.	0.0

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, □ LESS THAN OPTIMUM CONCENTRATION OF F.

57

UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB. AND COLOR [illegible] UNITS

0003 721201650520 TCHEFUNCTA CLUB ENTRIES RT.1 [illegible]PELTON, LOUISIANA 70433

ID NO	PCP	T	C	IMP	COA	CCR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721201650520	700	1	2	000	000	00	00	000	00	00	000	000	0	0	0	000	2	WELL	

AVERAGE ABS 0001	BA 0000	CD 0003	CR 0003	CCE 0000	F 0002	PB 0003	NO3 0001	SE 0001	SO4 0001	ZN 0003	TURB 0001	BETA 0001	AVERAGE NO.
.06		.000	.000		0.13 □	.004	0.1	.002	10.	.017	0.12	0.	

NO.	AS 0001	B 0001	CL 0001	CU 0003	CN 0001	FE 0002	MN 0002	AG 0003	TDS 0001	COLOR 0001	ALPHA 0001	COLI 0002	
	.00	.16	0.0	1.169 *	.000	.003	.004	.000	185.	0.	0.	0.0	01

MAXIMUM ABS	BA	CD	CR	CCE	F	PB	MAXIMUM NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
.06		.000	.000		0.14 □	.008	0.1	.002	10.	.024	0.12	0.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
	.00	.16	L 1.0	3.400 *	.000	.004	.005	.000	185.	L 5.	0.	0.0	1

* * * \

0008 7213861100260 GRETNA WATER DEPT. 100 FIFTH STREET [illegible] LOUISIANA 70053

ID NO	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIN	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
7213861100260	29000	4	1	540	011	00	05	200	10	00	004	001	0	0	0	001	0	MISSISSIPPI RIVER	003.34

	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
AVERAGE	0001	0000	0005	0005	0001	0005	0005	0001	0001	0001	0005	0001	0001	NO.
	.04		.000	.000	.107	0.28	.010	5.3	.006	60.	.058	0.11	5.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NO.	0001	0001	0001	0005	0001	0005	0005	0005	0001	0001	0001	0004	
	.00	.00	23.	.020	.000	.022	.000	.000	213.	0.	0.	0.0	00

	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
MAXIMUM														
	.04		.001	.000	.107	0.32	.013	5.3	.006	60.	.182	0.11	5.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
EXCD												
	.00	L .100	23.	.034	.000	.045	.001	.000	213.	L 5.	0.	0.0

* *

0017 7214599300260 JEFFERSON PARRISH W.W. DIST.NO.1POST OFFICE BOX 10007 NEW ORLEANS, LA. 70121

ID NO	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIN	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
7214599300260	201000	4	1	000	014	00	05	000	00	00	000	000	2	0	0	001	0	MISSISSIPPI RIVER	023.00

	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
AVERAGE	0001	0000	0016	0016	0001	0016	0016	0001	0001	0001	0016	0001	0001	NO.
	.04		.000	.000	.071	0.31	.009	5.7	.007	59.	.011	0.38	5.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NO.	0001	0001	0001	0016	0001	0016	0016	0016	0001	0001	0001	0015	
	.00	.22	34.	.034	.000	.032	.000	.000	203.	0.	0.	0.0	00

	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
MAXIMUM														
	.04		.001	.000	.071	0.34	.027	5.7	.007	59.	.032	0.38	5.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
EXCD												
	.00	.22	34.	.117	.000	.151	.004	.002	203.	L 5.	0.	0.0

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, # LESS THAN OPTIMUM CONCENTRATION OF F.

0013 721459400260 JEFFERSON PARISH W.A. DIST. NO.2&500 WEST BANK EXP. [illegible]ERSON, LA. 70076

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721459400260	100000	4	1	000	011	00	01	006	00	44	00*	001	0	0	0	001	0	MISSISSIPPI RIVER	009.13

AVERAGE

	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
AVERAGE	0001	0000	0012	0012	0001	0012	0012	0001	0001	0001	0012	0001	0000	NO.
	.06		.000	.001	.126	0.30 ¤	.009	5.3	.008	66.	.052	0.20		

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0001	0001	0001	0012	0001	0012	0012	0012	0001	0001	0000	0011	
	.00	.14	33.	.024	.000	.039	.000	.000	224.	0.		0.0	00

MAXIMUM	ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
	.06		.002	.016	.126	0.34 ¤	.016	5.3	.008	66.	.430	0.20		

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	.14	33.	.063	.000	.121	.002	.002	224.	L 5.		0.0

* * * \

0004 721574600520 MANDEVILLE WATER DEPT. MANDEVILLE, LOUISIANA 70448

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721574600520	9300	1	1	200	000	00	00	000	00	00	000	000	0	0	0	000	0	1 WELL	000.29

	AS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
AVERAGE						AVERAGE								AVERAGE
	0001	0000	0003	0003	0000	0003	0003	0001	0001	0001	0003	0001	0001	NO.
						¤								
	.06		.000	.000		0.35	.009	0.0	.002	10.	.008	0.10	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	CCLOR	ALPHA	COLI	
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0003	
	.00	.19	7.3	.025	.000	.007	.000	.000	228.	0.	0.	0.0	00

	AS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
MAXIMUM						MAXIMUM								MAXIMUM
ABS														EXCD
	.06		.000	.000		¤ 0.36	.017	L .1	.002	10.	.010	0.10	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
EXCD													
	.00	.19	7.3	.033	.000	.007	.000	.000	228.	L 5.	0.	0.0	

* *

0003 721574650520 FOUNTAINBLEAU STATE PARK MANDEVILLE, LOUISIANA 70448

ID NC	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721574650520	499	9	5	000	000	00	00	000	00	00	000	000	0	0	0	000	0	1 WELL	000.03

	AS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
AVERAGE						AVERAGE								AVERAGE
	0001	0000	0003	0003	0000	0003	0003	0001	0001	0001	0003	0001	0001	NO.
						¤								
	.03		.000	.000		0.64	.006	0.1	.002	12.	.006	0.14	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0003	
	.00	.29	5.5	.009	.000	.002	.001	.000	245.	7.	0.	0.0	00

	AS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
MAXIMUM						MAXIMUM								MAXIMUM
ABS														ExCD
	.03		.000	.000		¤ 0.64	.008	0.1	.002	12.	.008	0.14	0.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
EXCD												
	.00	.29	5.5	.011	.000	.004	.001	.000	245.	7.	0.	0.0

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, ¤ LESS THAN OPTIMUM CONCENTRATION OF F.

6

0004 721574700520 SOUTHEAST LOUISIANA HOSPITAL HAMMONDVILLE, LOUISIANA 70448

ID NO	POP	T	C	IMP	COA	CCR	TO	MIX	AER	SED	FIT	FIN	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721574700520	775	9	4	101	000	00	00	000	00	00	000	000	0	0	0	000	0	2 WELLS	000.30

AVERAGE

ARS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
0002	0000	0004	0004	0000	0004	0004	0002	0002	0002	0004	0002	0002	NO.
.04		.000	.000		0.28	.003	0.1	.001	11.	.012	0.14	0.	

NO.	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
	0002	0002	0002	0004	0002	0004	0004	0004	0002	0002	0002	0004	
	.00	.06	2.5	.028	.000	.006	.000	.001	203.	0.	0.	0.0	00

MAXIMUM ARS	BA	CD	CR	CCE	F	PB	MAXIMUM NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
.09		.001	.000		0.30	.008	0.2	.001	12.	.015	0.16	0.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	.12	5.0	.041	.000	.007	.001	.003	216.	L 5.	0.	0.0

* * * \

0007 721656600360 NEW ORLEANS S&W BD.-ALGIERS SWITCHING HALL NEW ORLEANS, LOUISIANA 70112

ID NO	POP	T	C	IMP	COA	COR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721656600360	19900	4	1		007	01	00	222	00	04	00*	001	0	0	0	021	0	MISSISSIPPI RIVER	006.27

	AVERAGE ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE NO.
	0001	0000	0006	0006	0001	0006	0006	0001	0001	0001	0006	0001	0001	
	.04		.000	.000	.028	0.29 □	.008	5.5	.008	62.	.024	0.18	5.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0001	0001	0001	0006	0001	0006	0006	0006	0001	0001	0001	0009	00
	.00	.00	40.	.016	.000	.010	.003	.000	241.	0.	0.	0.0	

	MAXIMUM ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
			.002	.000	.028	0.34 □	.013	5.5	.008	62.	.101	0.18	5.	

EXCD	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
	.00	L .100	40.	.033	.000	.022	.021	.000	241.	L 5.	0.	0.0

0003 * * *

THIS MAY 26, 1970 DRINKING WATER QUALITY DATA FROM "CWSS" COMPARED TO USPHS STANDARDS
UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB. AND COLOR IN STD. UNITS PAGE 334

0004 721602940520 PEARL RIVER AND OZONE WATER CO.
ID NC POP T C IMP COA CCR TO MIX AER SED FIT FIM AM RC FL DIS CL PEARL RIVER, LOUISIANA 70452
721602940520 120 1 2 510 000 00 00 000 00 00 000 000 0 0 0 000 0 SOURCE OF SUPPLY AV DAY
AVERAGE 2 WELLS 000.05
AVERAGE

ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
0002	0000	0004	0004	0000	0002	0004	0002	0002	0002	0004	0002	0002	AVERAGE
.05		.000	.000		¤ 0.49	.003	0.3	.002	11.	.015	0.11	0.	NO.

AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC. 0002	0002	0002	0004	0002	0002	0002	0004	0002	0002	0002	0002	
.00	.25	6.8	.026	.000	.005	.000	.000	297.	8.	0.	0.0	00

MAXIMUM ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
.07		.001	.000		¤ 0.49	.006	0.5	.002	11.	.018	0.12	0.	MAXIMUM EXCD

EXCD AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
.00	.33	7.0	.031	.000	.007	.000	.000	300.	8.	0.	0.0

0008 721776300440 ST.BERNARD PARISH W.WKS.DIST. #1P.O. BOX 1278
ID NC POP T C IMP COA CCR TO MIX AER SED FIT FIM AM RC FL DIS CL CHALMETTE, LOUISIANA 70043
721776300440 50000 4 1 060 004 01 05 020 00 10 000 001 0 0 0 001 0 SOURCE OF SUPPLY AV DAY
AVERAGE MISSISSIPPI RIVER 007.00
AVERAGE

ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
0001	0000	0007	0007	0000	0007	0007	0001	0001	0001	0007	0001	0001	AVERAGE
.05		.000	.008		¤ 0.59	.007	5.3	.005	65.	.041	1.30	6.	NO.

AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC. 0001	0001	0001	0007	0001	0007	0007	0007	0001	0001	0001	0006	
.00	.12	53.	.040	.000	.134	.011	.001	292.	0.	0.	0.3	00

MAXIMUM ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	
.05		.006	.035		¤ 0.64	.022	5.3	.005	65.	.146	1.30	6.	MAXIMUM EXCD

EXCD AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
.00	.12	53.	.102	.000	* 1 .501	.023	.003	292.	L 5.	0.	1.0

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, ¤ LESS THAN OPTIMUM CONCENTRATION OF F.

UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB. AND COLOR IN STD. UNITS

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0003  721776400440      ST.BERNARD PARISH W.WKS.DIST. #2ST. BERNARD HWY., EAST          ST. BERNARD, LOUISIANA      70085
   ID NO          POP  T C IMP    COA CCR TO MIX AER SED FIT FIM AM RG FL DIS CL      SOURCE OF SUPPLY            AV DAY
721776400440     6400 8 1 530    000  00 00 000  00  00 000 000  0  0  0 000  4  /ST BERN PWRD NO 1/ 721776300440  000.63
AVERAGE                                                                                                          AVERAGE
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
0001      0000     0003     0003     0000     0003     0003     0001     0001     0001     0003     0001     0000      NO.
                                              ¤
  .05              .002     .002              0.58     .016      5.3     .005      65.     .025     1.30

    AS       B        CL       CU       CN       FE       MN                AG       TDS      COLOR    ALPHA    COLI
NO. 0001     0001     0001     0003     0001     0003     0003              0003     0001     0001     0000     0002
                                                                                                                  00
    .00      .12      53.      .047     .000     .044     .009              .001     292.      0.                0.0

MAXIMUM                                                                                                          MAXIMUM
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
                                                                                                                 EXCD
                                              ¤
  .05              .006     .008              0.64     .022      5.3     .005      65.     .033     1.30

    AS       B        CL       CU       CN       FE       MN                AG       TDS      COLOR    ALPHA    COLI
EXCD
    .00      .12      53.      .052     .000     .054     .023              .003     292.     L 5.              0.0

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
0005  721811200520      SLIDELL WATER DEPT.                                        SLIDELL, LOUISIANA          70458
   ID NO          POP  T C IMP    COA CCR TO MIX AER SED FIT FIM AM RG FL DIS CL      SOURCE OF SUPPLY            AV DAY
721811200520    12000 1 1 510    000  00 00 000  00  00 000 000  0  0  0 000  0  3 WELLS                          002.50
AVERAGE                                                                                                          AVERAGE
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
0001      0000     0003     0003     0000     0002     0003     0001     0001     0001     0003     0001     0001      NO.
                                              ¤
  .04              .000     .000              0.29     .004      0.1     .001      13.     .005     0.13      0.

    AS       B        CL       CU       CN       FE       MN                AG       TDS      COLOR    ALPHA    COLI
NO. 0001     0001     0001     0003     0001     0002     0002              0003     0001     0001     0001     0002
                                                                                                                  00
    .00      .00       0.0     .008     .003     .005     .003              .000     260.      7.       0.       0.0

MAXIMUM                                                                                                          MAXIMUM
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
                                                                                                                 EXCD
                                              ¤
  .04              .000     .000              0.30     .008      0.1     .001      13.     .010     0.13      0.

    AS       B        CL       CU       CN       FE       MN                AG       TDS      COLOR    ALPHA    COLI
EXCD
    .00    L .100   L 1.0      .013     .003     .006     .005              .000     260.      7.       0.       0.0
```

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, ¤ LESS THAN OPTIMUM CONCENTRATION OF F.

THE MAY 26, 1970 DRINKING WATER QUALITY DATA FROM "CWSS" COMPARED TO USPHS STANDARDS PAGE 336
UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, COLIFORMS PER 100/ML, TURB. AND COLOR IN STD. UNITS

```
0001   721811250520      COUNTRY CLUB ESTATES (SLIDELL) WATER SUPPLY                    SLIDELL, LOUISIANA          70458
   ID NO          POP  T C IMP    COA COR TC MIX AER SED FIT FIM AM RC FL DIS CL      SOURCE OF SUPPLY            AV DAY
721811250520      400 1 1 000    000  00 00 000  00  00 000 000  0  0  0 000  0  1 WELL
AVERAGE                                                                                                          AVERAGE
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
0000      0000     0000     0000     0000     0000     0000     0000     0000     0000     0000     0000     0000      NO.


    AS       B        CL       CU       CN       FE       MN                 AG       TDS      COLOR    ALPHA    COLI
NO. 0000     0000     0000     0000     0000     0000     0000               0000     0000     0000     0000     0000
                                                                                                                  00


MAXIMUM                                                MAXIMUM                                                   MAXIMUM
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
                                                                                                                 EXCD


    AS       B        CL       CU       CN       FE       MN                 AG       TDS      COLOR    ALPHA    COLI
EXCD


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
0003   721811300520      TAMMANY MOBILE HOME PARK      101 BOSWORTH                   SLIDELL, LOUISIANA          70458
   ID NO          POP  T C IMP    COA COR TO MIX AER SED FIT FIM AM RC FL DIS CL      SOURCE OF SUPPLY            AV DAY
721811300520      250 9 3 000    000  00 00 000  00  00 000 000  0  0  0 000  0  1 WELL
AVERAGE                                                                                                          AVERAGE
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
0001      0000     0003     0003     0000     0002     0003     0001     0001     0001     0003     0001     0001      NO.
                                                    □
  .04              .000     .000               0.36     .005      0.1     .001      12.     .016     0.18      1.


    AS       B        CL       CU       CN       FE       MN                 AG       TDS      COLOR    ALPHA    COLI
NO. 0001     0001     0001     0003     0001     0002     0002               0003     0001     0001     0001     0002
                                                                                                                  00
    .00      .12       0.0     .008     .000     .002     .005               .000     265.       8.       0.      0.0


MAXIMUM                                                MAXIMUM                                                   MAXIMUM
 ABS      BA       CD       CR       CCE      F        PB       NO3      SE       SO4      ZN       TURB     BETA
                                                                                                                 EXCD
                                                    □
  .04              .000     .000               0.36     .008      0.1     .001      12.     .038     0.18      1.


    AS       B        CL       CU       CN       FE       MN                 AG       TDS      COLOR    ALPHA    COLI
EXCD
    .00      .12     L 1.0     .009     .000     .004     .006               .000     265.       8.       0.      0.0
```

* EXCEEDS RECOMMENDED STANDARDS, ** EXCEEDS MANDATORY STANDARDS, □ LESS THAN OPTIMUM CONCENTRATION OF F.

UNITS ARE MG/L EXCEPT: RADIATION IN PC/L, CCL IFORMS PER 100/ML, TURB, AND COLOR IN STD. UNITS

0003 721837200520 SUN WATER DEPT. SUN, LOUISIANA 70463

ID NC	POP	T	C	IMP	COA	CCR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721837200520	350	1	1	420	000	00	00	000	00	00	000	000	0	0	0	000	0	1 WELL	000.01

	AVERAGE ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
	0001	0000	0003	0003	0000	0003	0003	0001	0001	0001	0003	0001	0001	NO.
	.03		.000	.005		0.18	.009	0.2	.001	8.4	.107	6.00	2.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0003	02
	.00	.00	0.0	.010	.000	1.053	.051	.000	140.	7.	0.	0.0	

	MAXIMUM ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
												1		
	.03		.000	.017		0.19	.017	0.2	.001	8.4	.117	6.00	2.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
EXCD						3						
	.00	L .100	L 1.0	.012	.000	1.265	.053	.000	140.	7.	0.	0.0

0004 721928200260 WESTWEGO WATER DEPT. 415 AVENUE A WESTWEGO, LOUISIANA 70094

ID NC	POP	T	C	IMP	COA	CCR	TO	MIX	AER	SED	FIT	FIM	AM	RC	FL	DIS	CL	SOURCE OF SUPPLY	AV DAY
721928200260	15000	4	1	320	004	00	00	200	00	20	000	002	0	0	0	001	0	MISSISSIPPI RIVER	002.50

	AVERAGE ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	AVERAGE
	0001	0000	0003	0003	0001	0003	0003	0001	0001	0001	0003	0001	0001	NO.
	.03		.000	.010	.073	0.31	.019	5.6	.004	65.	.018	1.40	6.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI	
NC.	0001	0001	0001	0003	0001	0003	0003	0003	0001	0001	0001	0002	00
	.00	.17	30.	.033	.000	.166	.002	.000	244.	0.	0.	0.0	

	MAXIMUM ABS	BA	CD	CR	CCE	F	PB	NO3	SE	SO4	ZN	TURB	BETA	MAXIMUM EXCD
	.03		.001	.016	.073	0.37	.040	5.6	.004	65.	.025	1.40	6.	

	AS	B	CL	CU	CN	FE	MN	AG	TDS	COLOR	ALPHA	COLI
EXCD												
	L .030	.17	30.	.046	.000	.234	.002	.002	244.	L 5.	0.	0.0

* EXCEEDS RECOMMENDED STANDARDS. ** EXCEEDS MANDATORY STANDARDS. ¤ LESS THAN OPTIMUM CONCENTRATION OF F.

APPENDIX B

TABLE IV - RADIOCHEMICAL RESULTS

WATER SUPPLY	GROSS BETA pc/l (a) (b)	GROSS ALPHA pc/l (c)	STRONTIUM-90 pc/l (d)	RADIUM pc/l (e)
Conventional Water Supplies				
New Orleans (Carrollton)	5.2 ± 15%	<2		
East Jefferson PWWD #1	5.0 ± 17%	<2		
West Jefferson PWWD #2				
New Orleans (Algiers)	5.0 ± 17%	<2		
Westwego	5.6 ± 18%	<2	<1	<0.1
Gretna	4.7 ± 18%	<2	<1	<0.1
St. Bernard PWWD #1	6.0 ± 17%	<2	<1	<0.1
Slidell	<1	<2		
Grand Isle	5.0 ± 17%	<2		
St. Bernard PWWD #2	(See St. Bernard PWWD #1)			
Abita Springs	<1	<2		
"	1.1 ± 62%	<2		
Covington	1.2 ± 45%	<2		
"	<1	<2		
Madisonville	<1	<2		
Mandeville	<1	<2		
River Forest (Covington Mun.)	<1	<2		
Country Club (Slidell Mun)	(No sample taken)			
Sun	2.2 ± 31%	<2		
Venetian Isles	6.0 ± 19%	<2	<1	<0.1
Country Club Estates Subd.	<1	<2		
"	1.0 ± 52%	<2		
Kings Forest Subd.	1.2 ± 37%	<2		
Riverwood Subd.	1.3 ± 41%	<2		
Tchefuncta Club Estates	<1	<2		
Pearl River & Ozone Water Co.	<1	<2		
"	<1	<2		
Special Water Supplies				
Tammany Mobile Home Park	1.4 ± 44%	<2		
Southeast Louisiana Hosp.	<1	<2		
"	<1	<2		

(a) The error expressed is the percentage relative 2 sigma counting error.
(b) Minimum detectable limit for Gross Beta is 1 pci/l.
(c) Minimum detectable limit for Gross Alpha is 2 pci/l.
(d) Minimum detectable limit for Strontium-90 is 1 pci/l.

TABLE III - PESTICIDE ANALYSES ON SURFACE WATER SUPPLIES
(All results listed as ppb)

WATER SUPPLY	ALDRIN	CHLORDANE	DDT	DIELDRIN	ENDRIN	HEPTACHLOR	HEPTACHLOR-EPOXIDE	LINDANE	METHOXYCHLOR	TOXAPHENE
New Orleans (Carrollton)	0*	0	0	0	0	0	0	0	0	0
East Jefferson PWWD #1	0	0	<0.1	0	0	0	0	0	0	0
West Jefferson PWWD #2	0	0	0	0	0	0	0	0	0	0
New Orleans (Algiers)	0	<0.1	0	0	0	<0.1	<0.1	0	0	0
Westwego	0	0	<0.1	0	<0.1	<0.1	0	<0.1	0	0
Gretna	0	0	<0.1	<0.1	<0.1	0	0	0	0	0
St. Bernard PWWD #1	0	0	<0.1	0	0	0	0	0	0	0
Grand Isle	0	<0.1	0	0	0	<0.1	0	0	0	0

TABLE IV - BACTERIOLOGICAL RESULTS

WATER SUPPLY	RAW WATER				DISTRIBUTION SYSTEM			
	No. of Samples	Avg. Verl. Tot. Coli. per 100/ml	Avg. Fecal Coli. per 100/ml	Avg. Total Plate Ct. per 1/ml	No. of Samples	Positive Coliforms	Positive Fecal Coliforms	Avg. Total [illegible]
Conventional Water Supplies								
New Orleans (Carrollton)	1	600	100	TNTC	26	0	0	58
East Jefferson PWWD #1	1	4000	2000	TNTC	15	0	0	725
West Jefferson PWWD #2	1	4000	1000	TNTC	11	0	0	37[illegible]
New Orleans (Algiers)	1	0	0	TNTC	5	0	0	1[illegible]
Westwego	1	800	200	TNTC	2	0	0	4[illegible]
Gretna	1	300	200	TNTC	4	0	0	20[illegible]
St. Bernard PWWD #1	1	1000	1000	TNTC	6	0	0	72[illegible]
Slidell	3	0	0	9	2	0	0	1[illegible]
Grand Isle	0	--	--	--	2	0	0	267[illegible]
St. Bernard PWWD #2	0	--	--	--	2	0	0	TNTC
Abita Springs	2	0	0	172	2	0	0	0
Covington	2	0	0	1	2	0	0	2[illegible]
Madisonville	2	0	0	222	2	0	0	5[illegible]
Mandeville	2	0	0	5	2	0	0	4[illegible]
River Forest (Covington Mun)	1	0	0	0	2	0	0	2.[illegible]
Country Club Ests. (Slidell)	1	0	0	6	0	-	-	-
Sun	1	0	0	TNTC	2	0	0	56[illegible]
Venetian Isles	1	0	0	445	2	0	0	61[illegible]
Country Club Ests. Subd.	3	0	0	3	4	0	0	1[illegible]
Kings Forest Subd.	1	0	0	5	1	0	0	[illegible]
Riverwood Subd.	1	0	0	2	2	0	0	14[illegible]
Tchefuncta Club	1	0	0	7	2	0	0	9[illegible]
Pearl River & Ozone Water Co.	2	0	0	17	2	0	0	6[illegible]
Special Water Supplies								
Tammany Mobile Home Park	1	0	0	3	2	0	0	9[illegible]
Southeast Louisiana Hosp.	2	0	0	1.5	2	0	0	8.[illegible]

TABLE II - RADIOCHEMICAL RESULTS

WATER SUPPLY	GROSS BETA pc/l (a) (b)	GROSS ALPHA pc/l (c)	STRONTIUM-90 pc/l (d)	RADIUM-226 pc/l (e)
Conventional Water Supplies				
New Orleans (Carrollton)	5.2 ± 15%	<2		
East Jefferson PWWD #1	5.0 ± 17%	<2		
West Jefferson PWWD #2				
New Orleans (Algiers)	5.0 ± 17%	<2		
Westwego	5.6 ± 18%	<2		
Gretna	4.7 ± 18%	<2	<1	<0.1
St. Bernard PWWD #1	6.0 ± 17%	<2	<1	<0.1
Slidell	<1	<2	<1	<0.1
Grand Isle	5.0 ± 17%	<2		
St. Bernard PWWD #2	(See St. Bernard PWWD #1)			
Abita Springs	<1	<2		
"	1.1 ± 62%	<2		
Covington	1.2 ± 45%	<2		
"	<1	<2		
Madisonville	<1	<2		
Mandeville	<1	<2		
River Forest (Covington Mun.)	<1	<2		
Country Club (Slidell Mun)	(No sample taken)			
Sun	2.2 ± 31%	<2		
Venetian Isles	6.0 ± 19%	<2	<1	<0.1
Country Club Estates Subd.	<1	<2		
"	1.0 ± 52%	<2		
Kings Forest Subd.	1.2 ± 37%	<2		
Riverwood Subd.	1.3 ± 41%	<2		
Tchefuncta Club Estates	<1	<2		
Pearl River & Ozone Water Co.	<1	<2		
"	<1	<2		
Special Water Supplies				
Tammany Mobile Home Park	1.4 ± 44%	<2		
Southeast Louisiana Hosp.	<1	<2		
"	<1	<2		

(a) The error expressed is the percentage relative 2 sigma counting error.
(b) Minimum detectable limit for Gross Beta is 1 pci/l.
(c) Minimum detectable limit for Gross Alpha is 2 pci/l.
(d) Minimum detectable limit for Stontium-90 is 1 pci/l.
(e) Minimum detectable limit for Radium-226 is 0.1 pci/l.

TABLE III - PESTICIDE ANALYSES ON SURFACE WATER SUPPLIES
(All results listed as ppb)

WATER SUPPLY	ALDRIN	CHLORDANE	DDT	DIELDRIN	ENDRIN	HEPTACHLOR	HEPTACHLOR-EPOXIDE	LINDANE	METH-OXYCHLOR	TOXAPHENE
New Orleans (Carrollton)	0*	0	0	0	0	0	0	0	0	0
East Jefferson PWWD #1	0	0	<0.1	0	0	0	0	0	0	0
West Jefferson PWWD #2	0	0	0	0	0	0	0	0	0	0
New Orleans (Algiers)	0	<0.1	0	0	0	<0.1	<0.1	0	0	0
Westwego	0	0	<0.1	0	<0.1	<0.1	0	<0.1	0	0
Gretna	0	0	<0.1	<0.1	<0.1	0	0	0	0	0
St. Bernard PWWD #1	0	0	<0.1	0	0	0	0	0	0	0
Grand Isle	0	<0.1	0	0	0	<0.1	0	0	0	0

* - Pesticide was not detected.

TABLE IV - BACTERIOLOGICAL RESULTS

WATER SUPPLY	RAW WATER				DISTRIBUTION SYSTEM			
	No. of Samples	Avg. Veri. Tot. Coli. per 100/ml	Avg. Fecal Coli. per 100/ml	Avg. Total Plate Ct. per 1/ml	No. of Samples	Positive Coliforms	Positive Fecal Coliforms	Avg. Total Plate Ct.
Conventional Water Supplies								
New Orleans (Carrollton)	1	600	100	TNTC	26	0	0	58
East Jefferson PWWD #1	1	4000	2000	TNTC	15	0	0	725
West Jefferson PWWD #2	1	4000	1000	TNTC	11	0	0	370
New Orleans (Algiers)	1	0	0	TNTC	5	0	0	15
Westwego	1	800	200	TNTC	2	0	0	45
Gretna	1	300	200	TNTC	4	0	0	202
St. Bernard PWWD #1	1	1000	1000	TNTC	6	0	0	725
Slidell	3	0	0	9	2	0	0	11
Grand Isle	0	--	--	--	2	0	0	1675
St. Bernard PWWD #2	0	--	--	--	2	0	0	TNTC
Abita Springs	2	0	0	172	2	0	0	0
Covington	2	0	0	1	2	0	0	27
Madisonville	2	0	0	222	2	0	0	57
Mandeville	2	0	0	5	2	0	0	41
River Forest (Covington Mun)	1	0	0	0	2	0	0	2.5
Country Club Ests. (Slidell)	1	0	0	6	0	-	-	-
Sun	1	0	0	TNTC	2	0	0	565
Venetian Isles	1	0	0	445	2	0	0	610
Country Club Ests. Subd.	3	0	0	3	4	0	0	14
Kings Forest Subd.	1	0	0	5	1	0	0	2
Riverwood Subd.	1	0	0	2	2	0	0	141
Tchefuncta Club	1	0	0	7	2	0	0	95
Pearl River & Ozone Water Co.	2	0	0	17	2	0	0	62
Special Water Supplies								
Tammany Mobile Home Park	1	0	0	3	2	0	0	95
Southeast Louisiana Hosp.	2	0	0	1.5	2	0	0	8.5

APPENDIX C

FORMS USED IN SURVEY

FCA-1a (7-15)
(2-69)

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Consumer Protection and Environmental Health Service
Environmental Control Administration
Bureau of Water Hygiene

INVENTORY OF MUNICIPAL WATER FACILITIES

LATEST DATA IN PHS FILES | CURRENT DATA

STATE

COMMUNITY	POPULATION	YEAR OPER. STARTED	OWNERSHIP
	ESTIMATED POPULATION SERVED	PRESENT SUPPLY	
		PRESENT TREATMENT PLANT	
1	2	3	4

COMMUNITY OR FACILITY
Correct legal name
LOCATION
(1) a

Postal address of utility

COUNTY
(1) b

1960 CENSUS POPULATION (2) a	CURRENT ESTIMATED POPULATION SERVED (2) b	LAB. CONTROL (3)	OWNERSHIP (4)

NUMBER OF SERVICES	NUMBER OF METERS	LAB. CONTROL	SOURCE OF SUPPLY	SAFE YIELD IMPOUNDED MG	MAXIMUM DEPEND. DRAFT (GR. WATER) MG
5	6	7		8	

(5) CLASSIFICATION	NUMBER OF SERVICES	NUMBER OF METERS	MGD AVG. WATER
RESIDENTIAL a			
COMMERCIAL b			
INDUSTRIAL c			
PUBLIC d			
TOTAL e			

SOURCE OF SUPPLY (6)

SAFE YIELD IMPOUNDED MG (7) a	MAXIMUM DEPENDABLE DRAFT (GR. WATER) MG (7) b

RATED PLANT CAPACITY MGD	BYPASS PLANT CAPACITY MGD	TREATMENT	DISTRIBUTION STORAGE	PUMPED TO MAINS	IMPROVEMENTS NEEDED
9		10	11		12

RATED CAPACITY MGD (8) a	AVERAGE (8) b OUTPUT MGD	EMERGENCY POWER (8) c

TREATMENT (9) a

DIST. STORAGE	PUMPED TO MAINS MG (10) a	GRAVITY TO MAINS MG (10) b	IMPROVEMENTS NEEDED (11)

REMARKS

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MUNICIPAL WATER SUPPLY SANITARY SURVEY

Exp. March 1970

SURVEY DATE 76

1. Leave this blank (for office use only) 12 (DUP. ON EVERY CARD) Date of your [ ] [ ] [ ] [ ] [ ] [ ] mo. day yr.

2. Name of supply Same as on inventory

3. Location Same as on inventory
post office common name, if different

4. Demands, MGD:

	PRESENT	10-YR. ESTIMATE	UNKNOWN
A. Avg. day	From [ ] [ ] [ ] [ ] 22 23 24	[ ] [ ] [ ] [ ] [ ] 24 25 26	[ ] 30
B. Max. day	Plant [ ] [ ] [ ] [ ] 31 32 34 35	[ ] [ ] [ ] [ ] [ ] 36 37 38 40	[ ] 36
C. Max. month	Records [ ] [ ] [ ] [ ] 43 44 46 47	[ ] [ ] [ ] [ ] [ ] 48 49 50 52	[ ] 54

5. Water use has been restricted [ ] [ ] 55 56 times for a total of [ ] [ ] [ ] 57 59 days during any one year of the past 5 years.

6. LABORATORY CONTROL

A. Bacteriological (Distribution system only)

From Fig 1- D.W.S.

(1) Min. number samples recommended per month by PHS DWS → [ ] [ ] 60 62 UNKNOWN [ ] 63

(2) Avg. number/month for last 12 months [ ] [ ] 64 65 [ ] 66

(3) Range of least and most monthly samples from May be zero 68 70 to [ ] [ ] 71 73 [ ] 74

(4) Number of months the Drinking Water Standards were not met during the last 12 months for: No. of months

(a) Quality — Sec 5.2 - D.W.S. [ ] [ ] 76 78 [ ] 79

(b) Number of samples {Months when sample numbers < no. in 6.A.(1) [ ] [ ] 80 81 [ ] 82

(c) NONE collected No samples for ___ months. [ ] [ ] 83 84 [ ] 85

From plant records

(5) Are samples representative of distribution system? Judge yes 86 [ ] 87
from map of distribution system.

(6) Are check samples collected as provided for in the Drinking Water Standards? Sec 3.15 - D.W.S. yes [ ] 88 [ ] 89

(7) Are samples requiring check samples reported by telephone? yes [ ] 90 [ ] 91

(8) Is the laboratory certified? yes [ ] 92 [ ] 93

(a) Within the past 3 years? yes [ ] 94 [ ] 95

(b) If answer to one or both, by whom was it certified. State [ ] 96 [ ] 97

In operation from

(9) Are samples received by lab within 30 hours? yes [ ] 98 [ ] 99

ECA-19

B. Chemical (finished water only)

(1) Samples of finished water are analyzed each [ ]36 month, [ ]37 year, [ ]38 2 years, [ ]39 3 years, [ ]40 infrequently [ ]41 never.

(2) Type of analysis: [ ]42 everything except fr. (BS) [ ]43 partial, 16 any combination

(3) Date of last chemical analysis [ ][ ]45 mo. [ ][ ] day [ ][ ]50 yr.

(4) Analyzed by [ ]51 utility, [ ]52 state, [ ]53 PHS, [ ]54 university, [ ]55 other.

(5) Tests run for operational control and their frequency are:

Tests	Frequency				
	Continuous	Each shift	Daily	Weekly	Less frequent than weekly
Alkalinity	[ ]57	[ ]	[ ]	[ ]	[ ]
Aluminum	[ ]62	[ ]	[ ]	[ ]	[ ]
Chloride	[ ]67	[ ]	[ ]	[ ]	[ ]
Chlorine residual (Same Cards Two) [2]	[ ]72	[ ]	[ ]	[ ]	[ ]
Color	[ ]77	[ ]	[ ]	[ ]	[ ]
Fluoride	[ ]82	[ ]	[ ]	[ ]	[ ]
Hardness	[ ]87	[ ]	[ ]	[ ]	[ ]
Iron	[ ]92	[ ]	[ ]	[ ]	[ ]
Jar tests	[ ]97	[ ]	[ ]	[ ]	[ ]
Manganese	[ ]102	[ ]	[ ]	[ ]	[ ]
pH	[ ]107	[ ]	[ ]	[ ]	[ ]
Taste & Odor	[ ]112	[ ]	[ ]	[ ]	[ ]
Turbidity	[ ]117	[ ]	[ ]	[ ]	[ ]
Zeta potential	[ ]122	[ ]	[ ]	[ ]	[ ]
Other _____	[ ]127	[ ]	[ ]	[ ]	[ ]

Note: Indicate frequencies

C. Radioactivity

(1) Samples are analyzed each [ ]33 month, [ ]34 year, [ ]35 2 years, [ ]36 3 years, [ ]37 infrequently [ ]38 never. (Same Cards 2) [2] [ ]80

(2) Date of last radiological analysis [ ][ ]39 mo. [ ][ ] day [ ][ ] yr.

(3) Analyzed by [ ]40 utility, [ ]41 state, [ ]42 PHS, [ ]43 university, [ ]44 other. (specify)

7. SANITARY SURVEY

A. Date of most recent survey By others - Not of this one
(21 mo. day yr. 29 30)

B. Survey made by: ☐ 31 state, ☐ 32 PHS, ☐ 33 local health department, ☐ 34 utility, ☐ 35 consultant. "Survey" requires written report of findings

C. Facilities surveyed: ☐ 36 source, ☐ 37 transmission, ☐ 38 treatment, ☐ 39 storage, ☐ 40 distribution.

H. FACILITIES & OPERATION (describe deficiencies on reverse side)

	YES	NO
A. Are there common walls between finished and lesser quality water?	☐ 41	☐ 42
B. Are there inter-connections to other systems		
(1) of known acceptable quality "Sub-divisions, private, industrial, commercial" indicated by state health dept. acceptance.		
(2) of unknown quality		
(a) with protection Note how protected	☐ 45	☐ 46
(b) without protection	☐ 47	☐ 48
C. Is there a cross-connection control program		
(1) on new construction only	☐ 49	☐ 50
(2) for continuous re-inspection	☐ 51	☐ 52
D. Are finished water reservoirs properly covered?	☐ 53	☐ 54
E. Is there detectable chlorine residual in distant parts of the distribution system?	☐ 55	☐ 56
F. Can the treatment plant be by-passed?	☐ 57	☐ 58
G. Are there satisfactory procedures to:		
(1) prevent personal accidents	☐ 59	☐ 60
(2) prevent chlorine accidents	☐ 61	☐ 62
(3) disinfect all new and/or repaired distribution system mains, valves, fittings, including check samples before being placed in service?	☐ 63	☐ 64
H. Are there areas of low pressure (< 20 psi) in the distribution system under maximum water use?	☐ 65	☐ 66

I. Operating problems most often encountered are: ☐ 67 taste & odor ☐ 68 phenols, ☐ 69 corrosive water, ☐ 70 short filter runs, ☐ 71 other, specify.

8. FACILITIES & OPERATION, continued

J. Chlorination process was interrupted ☐☐ (72 73) times in the last 12 months.

(1) Interruptions were due to: ☐ (74) chlorinator failure, ☐ (75) feedwater pump, ☐ (76) changing cylinders, ☐ (77) power failure, ☐ (78) other, explain. (END CARD 4) [4] (80)

K. Percent of land area within service area where water is available (nearest whole percent) ☐☐☐ (13 15) %.

L. Were plans and specs. for treatment plant approved by the state? YES ☐ (16) NO ☐ (17)

9. SOURCE, TREATMENT & DISTRIBUTION (describe deficiencies on reverse side) Not

A. Are the following adequate:

	YES	NO
(1) Source, with respect to the following:		
(a) quantity	☐ (18)	☐ (19)
(b) bacteriological quality } Refer to PHS No. 1820	☐ (20)	☐ (21)
(c) chemical quality } Refer to PHS No. 1820	☐ (22)	☐ (23)
(d) physical quality } Refer to PHS No. 1820	☐ (24)	☐ (25)
(e) adequate protection	☐ (26)	☐ (27)
(2) Transmission of raw water	☐ (28)	☐ (29)
(3) Is the raw water sampled for:		
(a) Bacteriological contamination	☐ (30)	☐ (31)
(b) Chemical contamination	☐ (32)	☐ (33)
(4) Treatment, with respect to the folowing:		
(a) aeration	☐ (34)	☐ (35)
(b) chemical feed, capacity	☐ (36)	☐ (37)
(c) chemical feed, stand-by equipment	☐ (38)	☐ (39)
(d) chemical mixing	☐ (40)	☐ (41)
(e) flocculation	☐ (42)	☐ (43)

9. SOURCE, TREATMENT & DISTRIBUTION, continued

A. Are the following adequate (continued):

(4) Treatment, continued:

(f) settling

(g) recarbonation

(h) filtration At normal operating rates

(i) disinfection, capacity

(j) disinfection, stand-by equipment

(k) taste & odor control

(l) fluoridation

(5) Distribution, with respect to the following:

(a) storage

(b) booster chlorination

(c) high service pumping

(d) booster pumping

(e) pressure

(6) Maintenance

(7) Records for:

(a) disinfection

(b) filter run

(c) chemical consumption

(d) operational control tests

(e) bacteriological examinations

(8) Cross-connectio control

(a) ordinance

(b) program implementation

(c) progress

YES NO

END CARD 5

9. SOURCE, TREATMENT & DISTRIBUTION, continued

B. During the past 3 years, raw water quality has ☐ 19 improved, ☐ 20 deteriorated, or ☐ 21 stayed the same.

10. PERSONNEL

A. Water Purification Operator This is the responsible plant operator - Not supt.

(1) Highest level of formal education: ☐ 22 8th grade or less, ☐ 23 high school, ☐ 24 technical or trade school, ☐ 25 university.

(2) Level of training in water treatment: ☐ 26 college course, ☐ 27 technical or trade school, ☐ 28 short school, ☐ 29 on the job, ☐ 30 none, ☐ 31 other, specify _____.

(3) Length of time on this job: ☐☐ 32 33 years, ☐☐ 34 35 months.

(4) Number of previous positions as water treatment operator ☐☐ 36 37

(5) Total years of water purification experience ☐☐ 38 39

(6) Level of study in sanitary microbiology: ☐ 40 college course, ☐ 41 technical or trade school, ☐ 42 short school, ☐ 43 on the job, ☐ 44 none, ☐ 45 other, specify _____.

(7) Level of study in water chemistry: ☐ 46 college course, ☐ 47 technical or trade school, ☐ 48 short school, ☐ 49 on the job, ☐ 50 none, ☐ 51 other, specify. _____.

(8) Is the operator a full-time employee? ☐ 52 yes ☐ 53 no

(9) Salary range (per year) of operator: ☐ 54 <$1,999 ☐ 55 $2,000-4,999 ☐ 56 $5,000-7,499 ☐ 57 $7,500-9,999 ☐ 58 $10,000

10. PERSONNEL, continued

A. continued

(10) Is your present staff adequate in: Operator's opinion

(a) number ☐ yes (60) ☐ no (61)

(b) quality ☐ yes (62) ☐ no (63)

B. Operator's major complaint _____

_____

_____

C. Most frequent customer's complaint: Received by utility.

_____

_____

D. Management's most frequent complaint: _____

_____

_____

II. FINANCIAL INFORMATION

A. Bonded indebtedness: (water supply)

(1) General obligation bonds $ [ ] . END CARD 6 [6] 80

(a) statutory limit $ [ ] .

(2) Revenue bonds $ [ ] .

(a) statutory limit $ [ ] .

B. Capital stock, par value $ [ ] .

bonds, par value $ [ ] .

C. Water funds are [ ] kept separate or [ ] mingled with other funds.

D. Is there an annual payment to the general fund? [ ] yes [ ] no

E. Operation is controlled by: [ ] mayor-council, [ ] mayor-commission, [ ] independent water board, [ ] other, specify. _____ .

For city, district e owned on

F. Is there active planning for expansion or improvement? [ ] yes [ ] no

(1) Value of planned improvement $ [ ] .

(2) Planning by utility [ ] yes [ ] no utility only

(3) Planning by consultants [ ] yes [ ] no utility & consultants

END CARD 7 80

G. If expansion is planned, it will be carried out within:

	1 YR.	2-5 YRS.	6-10 YRS.
(1) Source	[ ]	[ ]	[ ]
(2) Treatment	[ ]	[ ]	[ ]
(3) Distribution	[ ]	[ ]	[ ]
(4) Other _____	[ ]	[ ]	[ ]

H. Costs of production:

	CENTS/1,000 GALLONS
(1) Chemicals	[ ] [ ] . [ ]
(2) Labor, power, etc.	[ ] [ ] . [ ]
(3) Depreciation	[ ] [ ] . [ ]
(4) Other, including office, administration, meter reading, collection, etc. _____	[ ] [ ] . [ ]
(5) Total	[ ] [ ] . [ ]

11. FINANCIAL INFORMATION, continued

1. Tariff (Residential)

(1) Connection fee $ [ ][ ][ ][ ]. (41–44)

(2) Sales unit is [ ] (45) per 1,000 gallons or [ ] (46) per 100 cu. ft.

(a) [ ][ ][ ] (47) cents for the first [ ][ ] (50–51) units

(b) [ ][ ][ ] (52) cents for the next [ ][ ] (55–56) units

(c) [ ][ ][ ] (57) cents for the next [ ][ ] (60–61) units

(d) etc. as needed to cover steps.

Adjust all rates to the units.

END CARD B [B] (80)

Note flat rate here as $/time u

APPENDIX C

UNITED STATES PUBLIC HEALTH SERVICE
ENVIRONMENTAL CONTROL ADMINISTRATION
BUREAU OF WATER HYGIENE

SERIAL # 85

PUNCH IN COL.

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY: Same as on inventory
CITY, COUNTY, STATE

FOR PUNCH CARD ONLY

2. WATER SUPPLY NAME: Same as on inventory

3. DATE OF SAMPLING — BEGINNING DATE OF COMPOSITE: MO. DAY (19 72) — ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE: MO. DAY YR. (72 74)

4. SAMPLE FROM: ☐ TREATMENT PLANT (2) ☐ WELL (1) ☐ RESERVOIR (7) ☐ DISTRIBUTION SYSTEM (4) ☐ OTHER (6) ☐

5. SAMPLING POINT LOCATION AND OR DESCRIPTION: ie. kitchen, 1234 Main ☐

6. TYPE OF WATER SAMPLE: ☐ FINISHED (3) ☐ PARTIALLY TREATED (4) ☐ RAW (2) ☐ BLANK (1) ☐

7. SOURCE OF WATER: ☐ SURFACE (9) ☐ GROUND (1) ☐ COMBINED (2) ☐ OTHER (0) ☐

8. SAMPLING METHOD: ☐ COMPOSITE (5) ☐ GRAB (3) ☐ OTHER (9) ☐

9. ANALYSIS REQUIRED: ☐ ORGANIC (5) ☐ TRACE ELEMENTS (4) ☐ WET (7) ☐ RADIO-CHEMICAL (8) ☐ OTHER (3) ☐

10. WATER SUPPLY CATEGORY: ☐ COMMUNITY WATER SUPPLY (8) ☐ NEWS (4) ☐ FEDERAL INSTALLATION (6) ☐ SPECIAL STUDY (1) ☐ OTHER (0) ☐

11. APPEARANCE OF SAMPLE? _____

12. ADDITIONAL REMARKS _____

13. COLLECTED BY _____ ☐ STATE ☐ OTHER

IF NOT WHITE PLEASE PRINT NAME

ADD. COMM. TO _____ DATE RECEIVED _____
PREFERABLY LOCAL

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INSTRUCTIONS: EVERY ITEM OF INFORMATION REQUIRED FROM THE SAMPLER IS NUMBERED (1 THROUGH 13). THESE ARE THE ONLY RESPONSES THE SAMPLER SHOULD MAKE. NOTE AREAS MARKED "DO NOT WRITE BELOW THIS LINE" AND "FOR OFFICE USE ONLY."

ITEM 1 SHOULD BE THE LOCATION OF THE WATER SUPPLY FACILITY WHICH PRODUCED THE WATER FOR THE SAMPLE. (EXAMPLE: CINCINNATI, HAMILTON, OHIO.)

ITEM 2 SHOULD BE THE FULL NAME OF THE WATER SUPPLY FACILITY. (EXAMPLE: CINCINNATI MUNICIPAL WATER WORKS)

ITEMS 4, 6, 7, AND 8 - CHECK THE BOX WHICH APPLIES

ITEMS 9 AND 10 - CHECK ONE OR MORE BOXES AS NECESSARY

ITEMS 3, 5, 11, 12, AND 13 SHOULD BE SELF-EXPLANATORY

ANY RESPONSE OF "OTHER" OR "SPECIAL STUDY" SHOULD BE EXPLAINED UNDER ITEM 12 - ADDITIONAL REMARKS.

IF NECESSARY FOR COMPLETE IDENTIFICATION OR EXPLANATION, PLEASE FEEL FREE TO USE THE BACK OF THE ORIGINAL (WHITE) COPY OR ATTACH AN ADDITIONAL PAGE OF LIKE SIZE.

DISTRIBUTION:

MAIL ORIGINAL (WHITE COPY) TO:

WATER QUALITY REGISTER BRANCH
BUREAU OF WATER HYGIENE
222 E. CENTRAL PARKWAY
CINCINNATI, OHIO 45202

BLUE	ENCLOSED WITH ORGANIC SAMPLE
PINK	ENCLOSED WITH TRACE METAL SAMPLE
YELLOW	ENCLOSED WITH WET CHEMISTRY SAMPLE
GREEN	ENCLOSED WITH RADIOCHEMICAL SAMPLE
TAN	RETAINED BY REGIONAL OFFICE OR SAMPLER

APPENDIX D

TASTE AND ODOR REPORT

APPENDIX D

I&D Problems of Lower Mississippi River Waterworks*

Summary, Conclusions and Recommendations

Although several community waterworks drawing water from the lower Mississippi River have been reported to have experienced substantial problems with taste and odor of their water, the water plant records which I examined were inadequate to define the nature and extent of the problem. At most plants routine threshold odor determinations were not made; several of the water plant operators discounted the value of such tests. Dates of the occurrence of the more severe taste and odor problems were generally not available. Personnel at three of the six plants which I visited reported they had no particular concern over taste and odor problems.

A cursory examination of plant operation records revealed that most of the plants routinely applied low level amounts of either activated carbon or potassium permanganate, with occassional more substantial applications (about 10 mg/l activated carbon). The St. Bernard Parish Waterworks District No. 1 was an exception in that it routinely applied 4 mg/l $KMnO_4$ at the river intake.

*Report by Graham Walton, June 19, 1969.

APPENDIX D

Water plants using lower Mississippi River water appear to have a frequent or continuous low-level taste and odor problems, with only an occassional intense taste and odor problem. It appears that the more intense taste and odor of the water is associated with unusual industrial discharges, river traffic accidents, or river traffic loading and unloading operations. In most cases, such an occurrence may result in a taste and odor problem which is experienced at only one or two of the numerous plants drawing lower Mississippi River water.

In discussing the problem with Mr. John Trygg, Director, Bureau of Environmental Health, Louisiana State Department of Health, it was agreed that Public Health Service assistance for solving this problem should be directed toward:

1. Offering a training course of Treatment and Control of Taste and Odor for water plant operators in the Lower Mississippi River area.
2. Conducting research to evaluate available processes for reducing taste and odor of waters containing various types of petrochemicals.

Report

During the period April 28 to May 2, 1969, the writer visited the Louisiana State Department of Health, six water plants, and the FWPCA's Lower Mississippi River Field Station to obtain information on the taste and odor problems experienced by waterworks drawing water from the lower Mississippi River.

APPENDIX D

The State Department of Health has a Waterworks Warning Network Plan whereby a waterworks notifys them of any abnormal taste and odor problem, and the Department of Health Engineer thereon alerts downstream waterworks which might be concerned. A cursory examination of the State's records on taste and odor problems revealed the following.

Date	Plant Reporting or Affected	Remarks
March 20, 1969	St. Bernard WW#1	Phenol conc. in intake water 6.5 µg/l.
February 5, 1969	East Jefferson, WW	Oil pollution
December 28, 1969	St. Bernard WW#1	Iodoform T&O
December 6, 1968	-	Barge containing 5000 ±±± penetrating asphalt sank in Mississippi River 20 mi upstream from Natchez.
November 9, 1967	St. Charles	light weight oil pollution
November 2, 1967	St. Charles	?
September 1, 1967	St. James	Oil pollution
June 20, 1967	?	Asphalt at Esso Dock at Baton Rouge

It was reported that several other incidents occurred for which written records were not made.

APPENDIX D

Mr. John Trygg, State Sanitary Engineer arranged for my visit to five public water treatment plants, and I arranged my visit to the PHS Hospital Plant, at Carville, Louisiana. Information resulting from my visit to each plant is briefly summarized as follows.

Mile 191.1, USPHS Hospital, Carville. Mr. James R. Buchtel, Sanitary Engineer, PHS. Taste and odor problems were not of much concern. Present production was only 0.25 mgd and the plant had capacity to produce more than 1 mgd. They had about 0.5 mg clean water storage. They routinely added about 2 mg/l of activated carbon to the influent to the first settling tank which had a displacement time of 2 hours. Thereaf: the water was coagulated, settled, filtered and disinfected. On rare occasions when the odor of the raw water was particularl: bad either the activated carbon application was increased or the plant shut down until the odor of the intake water was less objectionable.

Mile 125.1 St. Charles Parish Waterworks District No. 1. Mr. Ralph J. Schexnaydre, Plant Superintendent, stated that the normal low-level taste and odor problem was handled by daily one-shot applications of activated carbon to the water on top of each operating filter. Recent threshold odors, which were being run in cooperation with the FWPCA's studies, were usually $\leq$ 8 and none exceed 16.

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Occassionally a more severe problem occurred. When recognized - sometimes it was too late to prevent production of aesthetically inferior water - treatment was altered by:

1. Application of activated carbon (maximum dosage about 10 mg/l) to the influent of the mixing chamber of the clarifier.
2. Change point of adding chlorine from influent to clarifier to filter influent.

Mile 105.4 Jefferson Parish Waterworks District #1, Metaire, La.

Peter O. Schmid, Superintendent. No great concern about taste and odor problems. Formerly applied activated carbon, when needed, to intake water. A quick examination of the plant's 1968 records revealed no carbon applications for a period of 5 or 6 months beginning in May. Maximum carbon dosage said to be approximately 10 mg/l.

Mile 104.7. Carrollton Plant, New Orleans

George H. Hopkins, Superintendent. There is a continuous or nearly continuous low-level taste and odor of the intake water that is treatable by pre- and intermediate chlorination, plus the addition of potassium permanganate at the intake. Operating records for the Conventional Carrollton Plant for 1967 show applications of these chemicals as follows.

	Chlorine lb/mg	$KMnO_4$ mg/l
Avg.	40.0	0.7
Max.	76.4	1.5
Min.	19.7	0.0

For 1967 the total cost of chlorine plus potassium permanganate was only $3.15 per mg, or approximately 15 percent of the operational costs ($22.15 per mg). Plant effluent generally contained from 0.8 to 1.2 mg/l free chlorine. Distribution samples were reported to always contain at least 0.2 mg/l free chlorine. The persistance of free residual chlorine throughout the distribution system of a city the size of New Orleans is unusual, particularly during periods of relatively warm water. It indicates unusually small amounts of oxidizable organic matter in the treated water.

Occassionally the intake water has more intense odor. In such cases the $KMnO_4$ and/or chlorine applications are increased. In rare cases, such as occurred during a white oil spill, activated carbon is used.

Mile 99.1. Jefferson Parish Waterworks District No. 2

Clifford G. Smith, Superintendent. Have taste and odor problem which they associate with spills, etc. during loading and unloading at 3 separate industries whose docks are all within approximately 200 yards of the water plant's intake.

Taste and odor treatment using prechlorination and activated carbon as needed. Examination of plant records, May 1967 - April 1969, shows:

12 Month Period	Carbon Applications - No. of Days	Approx. Avg.* mg/l	Max. mg/l
May 1968-April, 1969	185	4	11
May 1967-April, 1968	146	4	9

*For days carbon was applied. Have plans to switch to $KMnO_4$ for Taste and Odor control.

Mile 87.9. St. Bernard parish Waterworks No. 1.

Mr. Dewey Nunez, Superintendent. This plant purified and softens water. Treatment normally consists of adding 4 mg/l $KMnO_4$ at the river intake, followed by 1/2 gpg ferrous sulfate and 4 gpg lime to the patented upflow clarification tanks, prior to the disinfection and filtration of the water.

Mr. Nunez considers taste and odor of water to be his major problem. It is particularly prevalent during the winter season (December through March). He reports having received as many as 100 complaints per day. Prior to 1966 ~~alum~~ activated carbon for taste and odor control, was placed on activated carbon. Presently $KMnO_4$ is used (4 mg/l application costs about $12 per mg), with occassional supplemental treatment by activated carbon.

Mr. Nunez attributes the taste and odor problems to industrial operations, including the loading and unloading of petroleum and petroleum products, at several nearby industrial plants. He has not been contacted by the FWPCA and the Coast Guard routinely does not patrol the river downstream from the Chalmette ship, which is about one mile upstream from the waterworks intake.

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FWPCA Lower Mississippi River Field Station

Luther S. Standifer, Chief. The FWPCA has a five year project which will cost about $2,250,000 underway. The object is to identify those substances causing taste and odor in lower Mississippi River Water, to determine their sources and to secure actions needed for their removal.

CAM samplers have been installed to sample raw and finished waters at:

Mile 260. Crown Zellerback, St. Francisville;

Mile 191. USPHS Hospital, Carville

Mile 147± Colonial Sugar, Gramercy

Mile 125 St. Charles WW Dist 1, New Sarpy

Mile 105, Carrollton W W, New Orleans

Mile 99, Jefferson Parrish WW Dist 2, Marrero

and two or more runs have been made with the mega CAM sampler at Jefferson Parish WW Dist 2. Each of these plants have been requested to run daily threshold odor determination. In addition, a sample of water is collected once each week from each of the cooperating plants and the threshold odor determined by a panel at Louisiana State University. To date the highest threshold odor reported by the panel was 46, most results were not greater than 16.

The examination of the extracts from the CAM samples has resulted in tentative identification of two organis, Bis-2 chloro-isopropyl-ether and phenyl-o bromo phenyl-ether.

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CAM Sampling Data

The PHS's National Water Quality Network established a station for CAM sampling of Mississippi River Water at the New Orleans Municipal Water plant in August, 1958. The FWPCA has continued the operation of this station since 1966. Initially CAM sampling was by a high flow rate unit, but starting in December 1964, a low-flow rate unit was used. In analyzing the CCE and CTE (Carbon Total Extract) data, the relative effectiveness of these two samples in recovering organics from water must be considered. CCE and CTE data for the intake water to the New Orleans municipal water plant (Carrollton?) are summarized in Table 1.

The PHS operated a CAM sampler on finished water at the New Orleans' Carrollton plant since March 3, 1968. The maximum CCE concentration was 101 µg/l, and only 3 or 23 values exceeded 63 µg/l.

Based on the CCE data, with due consideration for the greater recovery of CCE and CTE obtained when using the low-flow rate CAM sampler, the CCE in the New Orleans water is well within acceptable limits.

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Table 1 - CCE and CTE Concentrations in Mississippi River Water at New Orleans, Louisiana

Year	CCE, g/l Max.	Min.	CTE, g/l Max.	Min.
	(High-flow rate CAM sampler)			
1958	70(5)*	30	170(5)*	100
1959	110(4)	20	280(5)	90
1960	60(10)	20	150(10 & 12)	70
1961	50(5 & 10)	20	170 (1)	80
1962	50(4 & 5)	20	120(4)	70
1963	80(6)	20	170(4)	70
1964 thru Nov.	110(1)	30	250(7)	70
	(Low-flow rate CAM sampler)			
1964 Dec.	160(12)	110	960(12)	690
1965	230 (8)	80	1140(3)	340
1966	290(3)	60	1240(3)	280
1967	190(5)	70	1120(10)	420
1968 thru Aug.	180(3)	80	950(1)	580

*Figures in paranthesis indicate month or months during which highest concentration occurred.

GLOSSARY

Back Flow -- The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source. Back siphonage is one type of backflow.

Back Flow Connection -- Any arrangement whereby backflow can occur.

Back Siphonage -- The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel or other sources into a water supply pipe due to a negative pressure in such pipe.

Bad sample -- A bacteriological sample that showed the presence of coliform bacterial contamination.

Consumer -- One person using the water for domestic and culinary purposes.

Cross Connection -- Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other either water of unknown or questionable safety, or steam, gas, or chemical, whereby there may be a flow from one system to the other, the direction of flow depending on the pressure differential between the two systems. See Backflow and Back siphonage.

Fecal Coliform Bacteria -- That portion of the total coliform population which are capable of lactose fermentation at an elevated temperature of 44.5°C. Unlike some strains of the non-fecal members of the total coliform group, fecal coliforms have a specific high order of positive correlation with warm-blooded animal pollution, survive for a shorter time in water and soil, and more closely correlate with survival patterns of enteric pathogenic bacteria.

Good Sample-- A bacteriological sample that did not show the presence of coliform bacterial contamination.

Inter-Connection -- A connection between the water supply and one or more additional sources of water not under the jurisdiction or control of the water supply operator.

Mandatory Limit -- The upper limit of density of coliform bacteria as described in Section 3.23, as modified below, of the concentration of certain ions as described in Section 5.22 and 5.23 and of radioactivity as described in Section 6.22, Public Health Service Drinking Water Standards, 1962 (PHS Publication No. 956). For these samples collected for this study, the bacterial limit was exceeded if the arithmetic average was more than 1 coliform per 100 ml. Also, for this study the total chromium concentration was considered to be hexavalent chromium.

Persons Served -- The aggregate number of consumers.

Plate Count --A measure of the general bacterial population present in the water sample as described in Standard Methods for the Examination of Water and Wastewater, 12th Ed. These bacteria will produce colonies on plate count agar in 48 hours when incubated at 35 C. (95 F.).

Recommended Limit -- The upper limit of concentration of turbidity, color, chemicals, and radioactivity as described in Sections 4.2, 5.21, and 6.21, PHS Drinking Water Standards 1962 (PHS Publication No. 956).

Responsible Operator -- The operator at the treatment plant responsible for the day to day operation of the treatment facilities. Where there is no treatment, the person responsible for the operation of the system.
He is not necessarily the water superintendent.

Service Connection -- A physical connection to a water main for the purpose of conveying water to a building or onto a premise for use.

Standard Metropolitan Statistical Area -- The boundaries and titles of standard metropolitan statistical areas are established by the Bureau of the Budget with the advice of the Federal Committee on Standard Metropolitan Statistical Areas. This Committee is composed of representatives of the major statistical agencies of the Federal Government. In applying the following criteria, data from the following sources are used by the Committee:

Population, labor force, density, and occupational data: Bureau of the Census and Bureau of Employment Security.